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CANADA—DEPARTMENT OF TRADE AND COMMERCE
DOMINION BUREAU OF STATISTICS
MINING, METALLURGICAL AND CHEMICAL BRANCH

ANNUAL REPORT

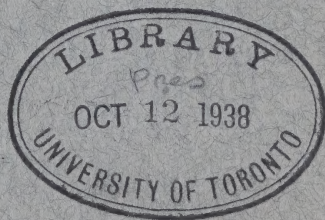
ON THE

MINERAL PRODUCTION OF
CANADA

DURING THE CALENDAR YEAR

1936

Published by Authority of the Hon. W. D. Euler, M.P.,
Minister of Trade and Commerce



OTTAWA
J. O. PATENAUDE, I.S.O.
PRINTER TO THE KING'S MOST EXCELLENT MAJESTY
1938

Price, 50 cents



LIST OF PUBLICATIONS

PREPARED IN THE

MINING, METALLURGICAL AND CHEMICAL BRANCH DOMINION BUREAU OF STATISTICS

MINERAL PRODUCTION (Mining and Metallurgy).

General Reports

Preliminary Reports (semi-annual) on the Mineral Production of Canada.

Monthly Reports on Canada's Leading Mineral Products.

Annual Report on the Mineral Production of Canada. (In one volume.)

A comprehensive record of the mining industry embodying historical and world data, detailed information on mineral production, imports and exports for Canada and general statistics relative to the mining industry on capital investment, employment, fuel consumption and power equipment arranged in 9 chapters each dealing with a particular branch of the industry. Statistics on production and trade in mineral products appear in detail in the appropriate chapters. Fully indexed. Chapter titles are: Canada—The Gold Mining Industry—The Silver Mining Industry—The Nickel-Copper Industry—Miscellaneous Metal Mining Industries—The Non-Ferrous Smelting and Refining Industry—The Coal Mining, Coke, Natural Gas, Peat and Petroleum Industries—Non-Metal Mining Industries (Other than Fuels)—The Clay Products and Other Structural Materials Industries—Notes on the Methods of Computing Values—Index—Directory.

COAL—

Monthly and Quarterly Reports on Coal and Coke Statistics for Canada.

A condensed report on production, imports and exports of coal and coke is issued monthly, publication being made about the twentieth of the next following month.

A more general review is published quarterly, showing statistics for each month, for the quarter, and for the year to date on the output by coal-mining districts and by provinces, imports and exports by ports and by kinds of coal, employment in coal-mining, and tonnage lost. There is also a section on coke showing production, imports, exports, distribution and consumption by months and by provincial groups.

Annual Report on Coal Statistics for Canada.

Text and tables showing for Canada, and for each of the coal-producing provinces, historical and current data on output, tonnage lost, disposition of coal from the mines, domestic and foreign shipments, exports and imports by ports, consumption of coal, prices, employment, salaries and wages paid, power equipment, capital investment, etc.

ANNUAL BULLETINS—

Metals—The Gold Mining Industry in Canada, which includes Alluvial Gold Mining, Auriferous Quartz Mining, Copper-Gold-Silver Mining, and tables showing Canadian and world production of Gold.—The Silver Mining Industry in Canada, which includes Silver-Cobalt-Arsenic Mining, Silver-Lead-Zinc Mining, and tables showing Canadian and world production of Arsenic, Cobalt, Lead, Silver and Zinc.—The Nickel-Copper Mining, Smelting and Refining Industry, which includes Canadian and world production of Nickel.—The Canadian and world Production of Copper.—Metals of the Platinum Group.—The Production of Miscellaneous Metals, including Antimony, Beryl, Bismuth, Cadmium, Chromite, Iron, Lithium, Manganese, Mercury, Molybdenite, Radium, Selenium, Tin, Titanium, Tungsten, Uranium.—The Non-Ferrous Smelting and Refining Industry.

Non-Metals—Abrasives—Asbestos—Coal—Feldspar—Gypsum—Iron Oxides—Mica—Natural Gas—Petroleum—Quartz—Salt—Talc and Soapstone—Miscellaneous Non-Metallic Minerals, including Actinolite, Barytes, Bituminous Sands, Fluorspar, Graphite, Magnesite dolomite, Bog Manganese, Natural Mineral Waters, Phosphate, Silica Brick, Sodium Carbonate, Sodium Sulphate, Sulphur (Pyrites).

Structural Materials—Cement—Clay and Clay Products—Lime—Sand and Gravel—Stone.

SEE INSIDE BACK COVER FOR PUBLICATIONS ON MANUFACTURES BASED CHIEFLY ON MINERALS

CANADA—DEPARTMENT OF TRADE AND COMMERCE
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NOTES ON STATISTICS OF PRODUCTION

In the collection of production data, the Dominion Bureau of Statistics makes a division between primary and secondary production. In the first-named class, there are separate sections for the collection of statistics on (a) **Agricultural Products**, (b) **Furs**, (c) **Fish**, (d) **Forest Products**, (e) **Mineral Products**.

In the second are included (a) **Manufacturing** and (b) **Construction**.

Manufacturing is subdivided into nine groups of industries, producing concerns being classified according to the principal component material of their major products. For example, manufactures of leather goods are classified under "Animal Products"; the pulp and paper industry under "Wood and Paper", etc. An outline of the scheme of classification in use for manufacturing industries is given below.

Manufactures of—

- (1) **Vegetable Products**, including—Coffee, and Spices; Cocoa and Chocolate; Preserved and Canned Products; Pickles, Vinegar and Cider; Flour and Cereals; Bread and other Bakery Products; Macaroni and Vermicelli; Distilled and Brewed Liquors and Wines; Rubber Products; Starch and Glucose; Sugar; Tobacco Products; Linseed Oil and Oil Cake.
- (2) **Animal Products**, including—Fish and Fish Products; Dairy Factory Products; Meat and Meat Products; Leather and Leather Products; Furs and Fur Products.
- (3) **Textiles and Textile Products**, including—Cotton Textiles (Cloth, Yarn, Thread and Waste); Woollen Textiles (Cloth, Yarn, Blankets, Felt, and Waste); Silk Products; Factory-Made Clothing; Carpets, Rugs and Mats; Cordage, Rope and Twine.
- (4) **Wood and Paper**, including—Pulp and Paper Mill Products; Paper Goods; Printing, Publishing and Lithographing; Saw and Planing Mill Products; Furniture; Carriages; Wagons and Sleighs; Wooden Containers; Woodenware; Turned Wood Products; and the Output of Similar Wood-Using Industries.
- (5) **Iron and Steel and Their Products**, including—Pig Iron and Ferro-Alloys; Steel and Rolled Products; Castings and Forgings; Boilers, Tanks and Engines; Farm Implements; Machinery; Automobiles; Auto Parts; Bicycles; Shipbuilding; Aircraft; Railway Rolling Stock; Wire and Wire Goods; Sheet Metal Products; Hardware, Tools and Cutlery; Bridge Building and Structural Steel Work; Miscellaneous Iron and Steel Products.
- (6) **Manufactures of Non-Ferrous Metal Products**, including—Aluminium Products; Brass and Copper Products; White Metal Alloys; Jewellery and Silverware; Electrical Apparatus and Supplies; Non-Ferrous Smelting and Refining; Miscellaneous Non-Ferrous Metal Products.
- (7) **Manufactures of the Non-Metallic Minerals**, including—Asbestos Products; Cement Products; Coke and Gas; Glass (blown, cut, ornamental, etc.); Lime; Petroleum Products; Products from Domestic Clays; Products from Imported Clays; Salt; Sand-Lime Brick; Dressed Stone; Artificial Abrasives and Abrasive Products; Miscellaneous Non-Metallic Mineral Products, including (a) Artificial Graphite and Electrodes, (b) Gypsum Products, (c) Mica Products, (d) Miscellaneous Non-Metallic Mineral Products, n.e.s.
- (8) **Chemicals and Allied Products**, including—Coal Tar Distillation; Acids, Alkalies and Salts; Compressed Gases; Explosives, Ammunition and Fireworks; Fertilizers; Medicinal and Pharmaceutical Preparations; Paints, Pigments and Varnishes; Soaps, Cleaning Preparations and Washing Compounds; Toilet Preparations; Inks; Adhesives; Polishes and Dressings; Hardwood Distillation; Miscellaneous Chemical Products, including (a) Boiler Compounds, (b) Cellulose Products, (c) Insecticides, (d) Sweeping Compounds, (e) Disinfectants, (f) Matches, (g) Dyes and Colours, (h) Chemical Products, n.e.s.
- (9) **Miscellaneous Products**, including—Brooms and Brushes; Electric Light and Power; Musical Instruments, etc.

The statistics of manufactures are also classified according to the **use or purpose** of the end product as follows:—

- (1) **Food**, including—Breadstuffs; Fish; Nuts; Fruits and Vegetables; Meats; Milk Products; Oils and Fats; Sugar; Infusions; Miscellaneous.
- (2) **Drink and Tobacco**, including—Beverages, alcoholic; Beverages, non-alcoholic; Tobacco.
- (3) **Clothing**, including—Boots and Shoes; Fur Goods; Garments and Personal Furnishings; Gloves and Mitts; Hats and Caps; Knitted Goods; Waterproofs; Miscellaneous.
- (4) **Personal Utilities**, including—Jewellery and Time-Pieces; Recreational Supplies; Personal Utilities, n.e.s.
- (5) **House Furnishings**.
- (6) **Books and Stationery**.
- (7) **Vehicles and Vessels**.
- (8) **Producers' Materials**, including—Farm Materials; Manufacturers' Materials; Building Materials; General Materials.
- (9) **Industrial Equipment**, including—Farm Equipment; Manufacturing Equipment; Trading Equipment; Service Equipment; Light, Heat and Power Equipment; General Equipment.
- (10) **Miscellaneous**.

CHART SHOWING



PREFACE

Reports on the mineral production of Canada have been issued annually by the Government of Canada since 1886. They were first published by the Geological Survey of Canada, later by the Mines Branch of the Department of Mines, and since 1921 by the Dominion Bureau of Statistics.

The present report contains final data for 1936 on production, imports and exports of metals and industrial minerals. Tables of world production have also been added for the use of those who may wish to make a study of world conditions and who may not have production figures of all countries readily at hand.

The report is divided into nine chapters, the first of which is of a general nature and comprises totals for the whole mining industry. The remaining chapters constitute a review by industrial groups, according to the predominating metals and minerals, for example, The Gold Mining Industry, The Silver Mining Industry, The Coal Mining Industry, The Asbestos Mining Industry, etc. In addition to data on production and shipments, details concerning capital employed, salaries and wages paid, number of employees, the amount expended for fuel, power and process supplies are given for each group.

Prior to 1935 the net selling value of products was considered to be the amount received by the shipper. Beginning with 1935 the Bureau computed the net value of sales by deducting the cost of fuel, electricity and process supplies from the amount received for products sold, therefore this figure is *not* comparable with similar figures in reports for years prior to 1935.

Attention is also drawn to the method of evaluating gold production. Prior to 1931 gold was valued at \$20.671834 per fine ounce, regardless of what might be defined as normal fluctuations in foreign exchange. Beginning with 1931 and each year since, gold has been valued at the price per ounce in Canadian dollars and so included with the total value of Canadian mineral production. This statistical procedure in the recording of gold values should be taken into account in making comparisons with corresponding data published in earlier reports.

The publication of this report is necessarily late because it is considered the final report of production for the year to which it refers, and care is taken to have complete returns before totals are made. It is, therefore, to be construed as a reference volume and its value increases with time. However, in order that the demand for early statistics may be met, an estimate of mineral production for the year preceding is issued on January 1st and about March 15th a more detailed report is prepared for presentation at the Annual Meeting of the Canadian Institute of Mining and Metallurgy.

Bulletins on the production of Canada's leading minerals are published monthly and since the fuel problem in Canada is of major importance separate annual and quarterly reports on coal statistics are published. Bulletins on various branches of the mining industry are prepared and distributed as the information becomes available and the data contained therein are later incorporated in this report.

As in former years, the Bureau has continued to co-operate with the provinces of Nova Scotia, New Brunswick, Saskatchewan, Alberta and British Columbia in the collection of coal statistics.

By arrangement, the Bureau and the Mines Departments of Nova Scotia, Quebec, Ontario, Manitoba, and British Columbia use joint forms in the collection of mineral statistics. This system is of considerable advantage to the operator, as he now completes only one common form in duplicate, and it also tends to greater comparability in Dominion and Provincial figures.

The cordial thanks of the Bureau are tendered to mine and smelter operators, to the Department of Mines and Resources, to the Royal Canadian Mint, and to the Imperial Institute, London, for assistance given and information made available. The railway and other transportation companies, as well as smelter operators outside of Canada, have also furnished data, the receipt of which is gratefully acknowledged.

This report has been prepared under the direction of Mr. W. H. Losee, B.Sc., Chief of the Mining, Metallurgical and Chemical Branch, by Mr. R. J. McDowall, B.Sc., and Mr. B. R. Hayden, of the mineral division staff.

R. H. COATS,
Dominion Statistician.

DOMINION BUREAU OF STATISTICS,
OTTAWA, April 12, 1938.

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DOMINION BUREAU OF STATISTICS

R. H. COATS, LL.D., F.R.S.C, F.S.S. (Hon.), Dominion Statistician
W. H. LOSEE, B.Sc., Chief of the Mining, Metallurgical and Chemical Branch

ANNUAL REPORT

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MINERAL PRODUCTION OF CANADA

DURING THE CALENDAR YEAR 1936

CHAPTER ONE

In 1936, for the second consecutive year, the annual value of Canadian mineral production established an all-time high record. This value, for the year under review, was computed at \$361,919,372 compared with \$312,344,457 in 1935 and \$191,228,225 in 1932, the nadir year of the last major economic depression. The per capita value of Canadian mineral output in 1936 was estimated at \$32.82 against \$28.56 in 1935 and \$2.23 in 1886, the first year for which complete mining statistics are available.

Increases in production of metals and of the more important non-metallic minerals and structural materials were almost general in 1936. The combined value of all metals totalled \$259,425,194 against \$221,800,849 in 1935 while that of the fuels, including coal, natural gas, petroleum and peat, amounted to \$59,983,320 compared with \$54,824,200 in the preceding year. A slow but encouraging improvement in building and heavy construction was reflected in the production of clay products, cement, and some of the other structural materials, the aggregate value of which increased from \$23,215,400 in 1935 to \$25,770,741 in 1936. Among the industrial non-metallic minerals, distinct gains in production over 1935 were recorded for sodium sulphate and sulphur (by-product); the tonnage of salt produced in 1936 was the greatest ever recorded in Canada but the value was considerably less than that for the preceding year, owing to the increasing consumption of lower priced grades in the manufacture of chemicals.

The mineral resources of Canada are considered to rank among the greatest of their kind and the rapid and successful development of these, especially during recent years, has established the Dominion in a position of prominence among the mineral producing nations of the world.

From an industrial viewpoint Canada is not only self-sufficient in nickel, copper, lead, zinc, platinum metals, silver, gypsum, and asbestos, but is a leading world exporter of these mineral products. Auriferous ores or deposits occur in nearly every province of the Dominion and the intensive development work conducted in both old and new gold mining camps has resulted in an almost continuous increase in Canadian gold production during the past decade.

Canadian reserves of coal are immense and highly developed but are located chiefly in the western provinces, Nova Scotia and New Brunswick; they are relatively far removed from the more densely populated industrial centres of Quebec and Ontario, a fact that has resulted, for economic reasons, in the importation of large tonnages of foreign coal into central Canada. Production of coal in 1936 totalled 15,229,182 short tons valued at \$45,791,934 compared with 13,888,006 short tons worth \$41,963,110 in 1935.

In addition to the minerals already referred to, Canada produces high quality talc, mica, graphite, soapstone and magnesium sulphate. During 1936 nepheline-syenite was produced commercially, for the first time, in Canada; it was mined in the Peterborough area of Ontario and was utilized for ceramic purposes.

At Port Hope, Ontario, radium, together with uranium compounds, are produced from the pitchblende ores of the Northwest Territories while selenium and tellurium are recovered in increasing quantities at electrolytic copper refineries located at Copper Cliff, Ontario, and Montreal East, Quebec. At Flin Flon, Manitoba, cadmium was produced commercially for the first time in 1936 by the Hudson Bay Mining and Smelting Company; this metal has also been recovered for some years at Trail, British Columbia, by the Consolidated Mining and Smelting Company of Canada, Limited. This latter company together with the Deloro Smelting and Refining Company of Deloro, Ontario, also recover the metal bismuth.

The vision and pioneering spirit of the Canadian mining fraternity combined with the adoption of the aeroplane for transportation and exploration have been the principal factors in the rapid rolling back of our wilderness frontiers. The last few years have witnessed the discovery and bringing into production of the rich pitchblende-silver deposits of Great Bear Lake in the Northwest Territories. At Fort Norman on the lower MacKenzie river, crude petroleum derived from local wells is being refined for consumption in northern mining camps. Farther to the south, important gold-bearing ores are being developed at Great Slave and Athabasca Lakes and it was reported in 1937 that the increased output of crude petroleum in the Turner Valley of Alberta was now sufficient to possibly supply the present demands of the Prairie Provinces. Of particular interest to Ontario was the report that preparations had been made for the mining and beneficiation of the carbonate iron ores occurring at the New Helen mine located in the Michipicoten district. In Manitoba a property in the Lac du Bonnet area was developed for the first commercial production of lithium ore in Canada.

Not only is the actual production of mineral wealth a very important factor in our domestic and foreign trade, but the diversified and widespread nature of operations in this great basic industry are of steadily increasing value in the opening up and settlement of our northland. The railroad often follows the discovery of economic ore deposits, water powers are harnessed, urban communities developed, arable land is tilled, additional markets created for Canadian manufacturers, and a field of labour and initiative provided for the youth of older Canada.

DOMINION BUREAU OF STATISTICS

Table 1.—Mineral Production of Canada, by Provinces, 1936

	Nova Scotia	New Brunswick	Quebec	Ontario	Mani- toba	Saskat- chewan	Alberta	British Columbia	Yukon (c)	Canada
METALLICS										
Arsenic (As ₂ O ₃).....lb.				1,365,606						1,365,606
				42,491						42,491
Bismuth.....lb.				3,552				360,613		364,165
				3,516				357,007		360,523
Cadmium.....lb.					148,133	111,749		526,034		785,916
					131,838	99,457		468,170		699,465
Chromite.....ton			545	(*)						
			8,508	5,070						
Cobalt.....lb.				887,591						13,573
				804,676						887,591
Copper.....lb.	779,307		66,340,175	287,914,078	29,853,220	14,971,609		21,169,343		421,027,732
	73,855		6,287,058	26,898,920	2,829,190	1,418,859		2,006,219		39,514,101
Gold.....fine oz.	11,960		666,905	2,378,503	139,273	48,981	109	451,938	50,359	8,748,028
(standard) \$	247,235		13,786,150	49,168,019	2,879,028	1,012,527	2,253	9,342,387	1,041,013	77,478,612
Estimated ex- change equal- ization on gold produced \$	171,724		9,575,533	34,150,941	1,999,705	703,277	1,565	6,489,001	723,063	53,814,809
Lead.....lb.	1,901,712		2,047,689	17,442				376,645,367	2,568,699	383,186,909
	74,414		80,126	683				14,738,133	100,513	14,993,869
Manganese ore ton		221								221
		1,596								1,596
Nickel.....lb.				169,739,393				(a)		169,739,393
				43,876,525				(a)		43,876,525
Palladium, Iridium, etc. fine oz.				103,671						103,671
				2,483,075						2,483,075
Platinum, fine oz.				131,551						131,571
				5,319,922				20		5,320,731
Radium and uranium (products).....\$								809		
Selenium.....lb.			168,417	106,300	50,760	25,380				(b)
			298,098	188,151	89,845	44,923				350,857
Silver.....fine oz.	107,642		724,339	5,219,366	791,489	642,497	9	9,748,715	1,100,430	621,017
	48,576		326,872	2,355,343	357,175	289,940	4	4,399,303	496,591	18,334,487
Tellurium.....lb.			19,502	10,197	3,928	1,964				8,273,804
			34,519	18,049	6,953	3,476				35,591
Titanium ore ton			2,566							62,997
			18,318							2,566
Zinc.....lb.	6,180,219		6,896,123	36,744,951	27,692,869			255,668,574		18,318
	204,874		228,606	1,218,095	918,019			8,475,413		333,182,736
										11,045,007
Total.....	820,678	1,596	30,643,788	165,315,381	9,511,829	4,490,478	3,822	46,276,442	2,361,180	259,425,194
NON-METALLICS										
FUELS										
Coal.....ton	6,649,102	368,618			4,029	1,020,792	5,696,960	1,489,171		15,229,182
	22,973,281	1,190,032			9,525	1,463,680	14,659,705	5,493,425	510	45,791,934
Natural gas M cu. ft.		606,246		10,006,743	600	90,839	17,407,820		1,100	28,113,348
		298,819		6,052,294	180	33,985	4,376,720		245	10,762,243
Peat.....ton			45	1,296						1,341
			255	7,121						7,376
Petroleum, crude.....brl.		17,112		165,495			1,312,368		5,399	1,500,374
		24,075		350,767			3,019,930		26,995	3,421,767
Total.....	22,973,281	1,512,926	255	6,410,182	9,705	1,497,665	22,056,355	5,493,425	29,526	59,983,320
OTHER NON-METALLICS										
Asbestos.....ton			301,287							301,287
			9,958,183							9,958,183
Diatomite.....ton	565			40						615
	11,300			2,000				10		13,650
Feldspar.....ton			8,115	8,409	1,322			350		17,846
			75,703	70,840	7,932					154,475
Fluorspar.....ton				75						75
				900						900

(*) Crude ore shipped for experimental purposes.

(a) Crude nickel ore shipped but data not available for publication.

(b) Data not available for publication.

(c) Includes gold, silver, natural gas and petroleum produced in the Northwest Territories.

Table 1.—Mineral Production of Canada, by Provinces, 1936—Continued

	Nova Scotia	New Brunswick	Quebec	Ontario	Mani- toba	Saskat- chewan	Alberta	British Columbia	Yukon	Canada
OTHER NON-METALLICS —Continued										
Graphite.....ton										
\$				88,812						88,812
Grindstones (includes pulpstones, etc.).....ton	70	412						87		569
\$	2,242	17,982						4,500		24,724
Gypsum.....ton	729,019	38,470		40,191	12,064			14,078		833,822
\$	808,294	123,560		182,783	87,076			77,258		1,278,971
Iron Oxides (Ochre).....ton			5,458					396		5,854
\$			65,630					4,000		69,630
Magnesitic- dolomite.....\$			768,742							768,742
Magnesium sulphate.....ton								654		654
\$								13,712		13,712
Mica.....lb.			544,214	1,057,343						1,601,557
\$			63,123	11,433						74,556
Mineral waters Imp. gal.			131,186	23,100						154,286
\$			17,399	1,117						18,516
Nepheline- syenite.....\$				37,426						37,426
Phosphate.....ton			525							525
\$			4,927							4,927
Quartz.....ton	6,764		78,975	884,585	90	76,089		146		1,046,649
\$	10,819		320,634	216,037	45	49,458		788		597,781
Salt.....ton	38,774			350,044	2,498					391,316
\$	183,915			1,557,078	32,151					1,773,144
Silica brick...M	1,922			471						2,393
\$	70,570			26,715						97,285
Soapstone.....\$			32,770							32,770
Sodium carbonate.....ton								192		192
\$								1,677		1,677
Sodium sulphate.....ton						75,598				75,598
\$						552,681				552,681
Sulphur (d).....ton			43,084	14,152				64,896		122,132
\$			282,743	141,520				608,792		1,033,055
Talc.....ton				14,461				47		14,508
\$				143,701				799		144,500
Total.....\$	1,087,140	141,542	11,589,854	2,480,362	127,204	602,139		711,876		16,740,117
CLAY PRODUCTS AND OTHER STRUCTURAL MATERIALS										
Clay Products										
Clay—										
Fireclay.....ton	1,214	35				621		567		2,437
\$	3,902	1,415				4,665		7,657		17,639
Bentonite.....ton								120		120
\$								180		180
Brick—										
Soft mud process—										
Face.....M	676		215	4,914			58	234		6,097
\$	14,026		2,363	84,210			1,332	9,447		111,378
Common.....M	4,546	1,477	2,482	8,443	2,639		2,504	2,089		24,180
\$	52,702	20,653	22,057	113,088	40,958		23,928	29,304		302,690
Stiff mud process— (wire cut)—										
Face.....M	53	128	9,803	19,271	283	355	13	312		30,218
\$	901	3,188	191,085	352,053	7,012	11,834	227	9,465		575,765
Common.....M	696	658	18,922	13,644		324	110	1,238		35,592
\$	8,379	8,279	248,647	197,475		3,385	780	17,133		484,078
Dry press—										
Face.....M			2,161	5,341		87	1,372			8,961
\$			52,096	95,755		3,746	14,327			165,924
Common.....M				3,906		11	6,324			10,241
\$				57,079		210	43,496			100,785

(d) Sulphur content of pyrites shipped and estimated sulphur contained in sulphuric acid made from waste smelter gases.

Table 1.—Mineral Production of Canada, by Provinces, 1936—Concluded

	Nova Scotia	New Brunswick	Quebec	Ontario	Mani- toba	Saskat- chewan	Alberta	British Columbia	Yukon	Canada
CLAY PRODUCTS, Etc.— <i>Conc.</i>										
Brick— <i>Conc.</i>										
Fancy or orna- mental brick.....M				24			1			25
\$				1,295			79			1,374
Sewer brick...M				416						418
\$				6,723						6,778
Paving brick M										116
\$										3,149
Firebrick....M							2,503			2,548
\$	6					395	14			118,923
Fireclay blocks and shapes...\$	210					19,676	755			
Structural tile— Hollow blocks.....ton	471	894				46,968		16,838		65,171
\$	39,990	2,828	135,144	223,545	3,903	5,100	24,504	3,341		58,501
Roofing tile...No.				43,600				32,846		467,860
\$				1,856				9,130		52,730
Floor tile (quarries) Sq. ft.				95,540				2,198		97,738
\$				13,484				314		13,798
Drain tile....M	135	771	438	6,000	64		27	713		8,148
\$	3,676	35,392	13,714	131,041	3,691		1,751	25,325		214,590
Sewer pipe, copings, flue lings, etc....\$	230,130		26,659	235,238			67,604	28,854		588,485
Pottery, glazed or unglazed..\$		29,529		51,507			134,491	2,875		218,402
Other clay products.....\$	867	78		9,587				1,387		11,919
Total.....\$	355,254	102,256	691,765	1,573,936	55,564	95,584	315,777	280,891		3,471,027
OTHER STRUCTURAL MATERIALS										
Cement.....brl.			2,093,130	1,542,463	348,042		243,534	281,549		4,508,718
\$			2,945,074	2,180,895	783,095		482,197	516,931		6,908,192
Lime.....ton	15,664	17,842	133,254	246,593	21,760		9,129	24,159		468,401
\$	119,230	128,016	718,585	1,946,060	211,035		78,259	134,785		3,335,970
Sand and gravel.....ton	1,947,471	(e) 970,945	5,490,280	8,498,153	1,852,606	716,910	894,380	1,753,415		22,124,160
\$	941,366	567,797	1,418,231	2,227,620	545,130	284,531	339,928	596,796		6,921,399
Slate.....ton			803	260				184		1,247
\$			855	2,080				2,479		5,414
Stone.....ton	254,572	59,431	1,513,249	2,706,420	49,506		13,916	384,571		4,981,665
\$	375,329	133,758	1,728,512	2,396,376	71,965		29,388	393,411		5,128,739
Total.....\$	1,435,925	829,571	6,811,257	8,753,031	1,611,225	284,531	929,772	1,644,402		22,299,714
Grand Total..\$	26,672,278	2,587,891	49,736,919	184,532,892	11,315,527	6,970,397	23,305,726	54,407,036	2,390,706	361,919,372

(c)

(e) Includes Prince Edward Island—17,975 tons, \$2,663.

(c) Includes production in the Northwest Territories.

Table 2.—Quantities and Values of Mineral Products from Canadian Sources, 1935 and 1936 ⁽¹⁾

	1935		1936		Per cent Increase (+) or Decrease (—)	
	Quantity	Value	Quantity	Value	Quantity	Value
METALLICS		\$		\$		\$
Arsenic (As ₂ O ₃)..... lb.	2,558,789	75,326	1,365,606	42,491	— 46.63	— 43.59
Bismuth..... lb.	13,797	13,245	364,165	360,523	+2,539.45	+2,621.96
Cadmium..... lb.	580,530	441,203	785,916	699,465	+ 35.38	+ 58.54
Chromite..... tons	1,144	14,947	13,578	—	—	9.16
Cobalt..... lb.	681,419	512,705	887,591	804,676	+ 30.26	+ 56.95
Copper..... lb.	418,997,700	32,311,960	421,027,732	39,514,101	+ 0.48	+ 22.29
Gold..... fine oz.	3,284,890	67,904,700	3,748,028	77,478,612	+ 14.10	+ 14.10
Estimated exchange equalization paid for gold produced.....		47,690,579		53,814,809		+ 12.84
Lead..... lb.	339,105,079	10,624,772	383,180,909	14,993,869	+ 13.00	+ 41.12
Manganese ore..... tons	100	800	221	1,596	+ 121.00	+ 99.50
Molybdenite..... lb.						
Nickel..... lb.	138,516,240	35,345,103	169,739,393	43,876,525	+ 22.54	+ 24.14
Palladium, Rhodium, Iridium, etc. fine oz.	84,772	1,962,937	103,671	2,483,075	+ 22.29	+ 26.50
Platinum..... fine oz.	105,374	3,445,730	131,571	5,320,731	+ 24.86	+ 54.42
Radium and Uranium.....	not available for publication					
Selenium..... lb.	366,425	703,536	350,857	621,017	— 4.25	— 11.73
Silver..... fine oz.	16,618,558	10,767,148	18,334,487	8,273,804	+ 10.33	+ 23.16
Tellurium..... lb.	16,425	32,850	35,591	62,997	+ 116.69	+ 91.77
Titanium ore..... tons	2,288	16,400	2,566	18,318	+ 12.15	+ 11.70
Zinc..... lb.	320,649,859	9,936,908	333,182,736	11,045,007	+ 3.91	+ 11.15
Total.....		221,800,849		259,425,194		+ 16.96
NON-METALLICS—FUELS						
Coal..... tons	13,888,006	41,963,110	15,229,182	45,791,934	+ 9.66	+ 9.12
Natural gas..... M cu. ft.	24,910,786	9,363,141	28,113,348	10,762,243	+ 12.86	+ 14.94
Peat..... tons	1,340	5,761	1,341	7,376	+ 0.07	+ 28.03
Petroleum, crude..... brls.	1,446,620	3,492,188	1,500,374	3,421,767	+ 3.72	— 2.02
Total.....		54,824,200		59,983,320		+ 9.41
OTHER NON-METALLICS						
Asbestos..... tons	210,467	7,054,614	301,287	9,958,183	+ 43.15	+ 41.16
Barytes..... tons						
Bituminous sands..... tons	40	160				
Diatomite..... tons	823	33,140	615	13,650	— 25.27	— 58.81
Feldspar..... tons	17,742	144,330	17,846	154,475	+ 0.59	+ 7.03
Fluorspar..... tons	75	900	75	900		
Graphite..... tons		79,781		88,812		+ 11.32
Grindstones†..... tons	708	34,010	569	24,724	— 19.63	— 27.30
Gypsum..... tons	541,864	932,203	833,822	1,278,971	+ 53.88	+ 37.20
Iron oxides (ochres)..... tons	5,516	77,075	5,854	69,630	+ 6.13	+ 9.66
Magnesitic dolomite.....		486,084		768,742		+ 58.15
Magnesium sulphate..... tons	340	7,965	654	13,712	+ 92.35	+ 72.15
Mica..... tons	628	82,038	801	74,556	+ 27.55	+ 9.12
Mineral waters..... imp. gal.	146,516	16,590	154,286	18,516	+ 5.30	+ 11.61
Nepheline-syenite.....				37,426		
Phosphate..... tons	186	1,103	525	4,927	+ 182.26	+ 346.69
Quartz..... tons	233,002	424,882	(b) 1,046,649	597,781	+ 349.20	+ 40.69
Salt..... tons	360,343	1,880,978	391,316	1,773,144	+ 8.60	+ 5.73
Silica brick..... M	2,461	96,194	2,393	97,285	— 2.76	+ 1.13
Soapstones.....		32,053		32,770		+ 2.24
Sodium carbonate..... tons	242	2,430	192	1,677	— 20.66	— 30.99
Sodium sulphate..... tons	44,817	343,764	75,598	552,681	+ 68.68	+ 60.77
Sulphur*..... tons	67,446	634,235	122,132	1,033,055	+ 81.08	+ 62.88
Talc..... tons	13,803	139,479	14,508	144,500	+ 5.11	+ 3.60
Volcanic dust..... tons						
Total.....		12,504,008		16,740,117		+ 33.88
CLAY PRODUCTS AND OTHER STRUCTURAL MATERIALS						
CLAY PRODUCTS						
Fireclay and other clay..... tons	2,272	15,574	2,437	17,639	+ 7.26	+ 13.26
Bentonite..... tons	41	781	120	180	+ 192.68	— 76.95
Kaolin..... tons	170	1,520				
Brick—Soft mud process Face..... M	6,995	122,215	6,067	111,378	— 12.84	— 8.87
Common..... M	21,197	259,504	24,180	302,690	+ 14.07	+ 16.64
Stiff mud process Face..... M	25,289	500,066	30,218	575,765	+ 19.49	+ 15.14
(wire cut) Common..... M	32,334	437,123	35,592	484,078	+ 10.08	+ 10.74
Dry press..... Face..... M	8,454	175,042	8,961	165,924	+ 6.00	+ 5.21
Common..... M	6,381	55,253	10,241	100,785	+ 60.49	+ 82.41

(1) Unless otherwise noted, all total values of mineral production from 1931 to 1936, inclusive, contain estimated exchange equalization on gold produced.

† Includes grindstones, pulpstones and scythstones.

* Sulphur content of pyrites shipped and estimated sulphur salvaged from smelter gases.

(b) Includes low grade silica fluxing sand for first time.

Table 2.—Quantities and Values of Mineral Products from Canadian Sources, 1935 and 1936—Concluded

	1935		1936		Per cent Increase (+) or Decrease (—)	
	Quantity	Value	Quantity	Value	Quantity	Value
		\$		\$		\$
CLAY PRODUCTS—Concluded						
Brick—Fancy or ornamental brick..... M	13	728	25	1,374	+	88.74
Sewer brick..... M	175	5,236	418	6,778	+	29.45
Paving brick..... M	15	627	116	3,149	+	402.23
Firebrick..... M	1,817	90,149	2,548	118,923	+	31.92
Fireclay blocks and shapes.....		71,344		65,171	—	8.65
Hollow blocks..... tons	47,195	344,608	58,501	467,860	+	35.77
Roofing tile..... No.	82,015	3,669	52,730	2,139	—	41.70
Floor tile (quarries)..... sq. ft.	51,765	7,629	97,738	13,798	+	80.86
Ceramic tile.....		615				
Drain tile..... M	7,124	205,336	8,148	214,590	+	4.51
Sewer pipe, copings, flue linings, etc.....		491,559		588,485	+	22.20
Pottery, glazed or unglazed.....		220,711		218,402	—	1.05
Other clay products.....		13,274		11,919	—	10.21
Total.....		3,012,563		3,471,027		+ 15.22
OTHER STRUCTURAL MATERIALS						
Cement..... brls.	3,648,086	5,580,043	4,508,718	6,908,192	+	23.59
Lime (a)..... tons	405,419	2,925,791	468,401	3,335,970	+	15.54
Sand and gravel..... tons	21,213,489	6,389,440	22,124,160	6,921,399	+	4.29
Slate..... tons	1,129	4,329	1,247	5,414	+	10.45
Stone—						
Granite..... tons	326,354	1,126,287	941,743	1,319,313	+	188.56
Limestone..... tons	3,631,665	3,253,573	3,731,548	3,143,872	—	2.75
Marble..... tons	15,975	85,369	22,866	169,698	+	43.14
Sandstone..... tons	342,824	838,005	285,508	495,556	—	16.72
Total.....		20,202,837		22,299,714		+ 10.38
Grand Total (Canadian Funds).....		312,344,457		361,919,372		+ 15.87

(a) Includes lime used for chemical purposes.

Table 3.—Mineral Production of Canada for the Period January 1 to June 30, 1936 and 1937

	1936		1937	
	January 1 to June 30		January 1 to June 30	
	Quantity	Value	Quantity	Value
		\$		\$
METALLICS				
Arsenic (As ₂ O ₃)..... lb.	642,309	20,095	796,229	24,492
Bismuth..... lb.	146,170	146,170		
Cadmium..... lb.	336,936	350,413	373,014	559,522
Chromite.....		8,138		3,286
Cobalt..... lb.	438,773	356,118	240,862	379,195
Copper..... lb.	205,967,475	18,230,073	243,919,406	34,377,884
Gold..... fine oz.	1,769,206	36,572,732	1,966,858	40,658,562
Estimated exchange equalization on gold produced.....		25,526,398		28,161,799
Lead..... lb.	180,866,815	21,479,445	199,204,362	11,667,399
Nickel..... lb.	83,053,755	1,237,338	111,610,392	29,218,283
Palladium, Rhodium, Iridium, etc..... fine oz.	52,685	57,642		1,433,407
Platinum..... fine oz.	62,791	2,009,312	68,244	3,685,858
Radium and Uranium products.....		Data not available for publication		
Selenium..... lb.	175,017	316,781	165,994	285,509
Silver..... fine oz.	8,737,157	3,956,272	9,605,095	4,322,292
Tellurium..... lb.	25,892	46,606		79,177
Titanium ore..... ton				5,623
Zinc..... lb.	157,869,552	5,225,482	170,535,713	9,348,768
Total.....		121,847,885		164,211,056

Table 3.—Mineral Production of Canada for the Period January 1 to June 30, 1936 and 1937—*Concluded*

	1936		1937		
	January 1 to June 30		January 1 to June 30		
	Quantity	Value	Quantity	Value	
Non-METALLICS					
Fuels					
Coal.....	ton	6,879,419	20,444,682	6,996,343	21,326,043
Natural gas.....	M cu. ft.	15,808,755	6,035,390	15,536,287	5,983,142
Peat.....	ton				
Petroleum, crude.....	brl.	674,992	1,621,958	1,062,046	2,384,760
Total.....			28,102,030		29,693,945
INDUSTRIAL MINERALS					
Asbestos.....	ton	120,437	4,016,912	197,800	6,678,083
Diatomite.....	ton	175	3,500	197	4,925
Feldspar.....	ton	7,867	66,768	8,425	77,216
Fluorspar.....	ton	6	90	43	752
Graphite.....	\$		41,738		63,070
Gypsum.....	ton	265,309	462,857	377,198	648,250
Iron oxides (ochre).....	ton	1,548	21,395	2,735	42,580
Lithium ore.....	\$				1,202
Magnesium sulphate.....	ton	415	8,517	479	9,529
Magnetitic-dolomite.....	\$		295,177		340,907
Mica.....	lb.	1,177,581	34,936	1,327,480	65,737
Mineral waters.....	Imp.gal.	41,512	6,882	45,169	7,142
Nepheline syenite.....	\$		9,069		51,087
Phosphate.....	ton	382	3,507		
Quartz.....	ton	105,858	228,248	628,807	495,411
Salt.....	ton	176,901	826,695	208,814	842,865
Silica brick.....	M	437	20,568	1,000	53,299
Soapstone.....	\$		11,713		11,516
Sodium sulphate.....	ton	30,610	235,158	37,817	264,784
Sulphur (x).....	ton	48,652	442,631	62,055	544,425
Talc.....	ton	6,932	69,753	6,241	60,485
Total.....			6,806,114		10,263,265
STRUCTURAL MATERIALS					
Clay products.....	\$		1,260,291		1,596,548
Cement.....	brl.	1,629,941	2,493,800	2,090,006	3,200,000
Lime.....	ton	204,097	1,472,305	269,314	1,918,000
Stone and sand and gravel (a).....	\$		3,500,000		4,500,000
Total (a).....			8,726,396		11,214,548
Grand Total.....	\$		165,482,425		215,382,814

(x) Sulphur content of pyrites shipped and estimated sulphur salvaged from waste smelter gases.

(a) Estimated.

FOREIGN EXCHANGE, 1936

(Internal Trade Branch)

Other exchange developments were overshadowed during 1936 by the struggle to preserve the gold parities of European gold 'bloc' currencies, the French franc, the Swiss franc, and the Dutch guilder. On September 25, the French Minister of Finance announced that the franc would be devalued, and the same action was taken in the next few days by the Netherlands, Switzerland, Italy, Czechoslovakia, and Roumania. The co-operation of central bank and Treasury authorities, particularly those of the United Kingdom, the United States, and France resulted in comparative stability being restored by the middle of October. A marked improvement in the Brazilian milreis and the Argentine peso also attracted considerable interest during 1936, as did the weak position of the Japanese yen as the year closed. Throughout 1936, New York funds at Montreal remained close to par, sometimes slightly above and sometimes a little below. Following devaluation of the franc, sterling rates at Montreal dropped about 14 cents to close the year at approximately \$4.90.

Table 4.—Exchange Quotations at Montreal, 1936

NOTE.—The noon rates in Canadian Funds upon which these averages are based, have been supplied by the Bank of Canada.

Former Gold Parities	New York Funds	London Sterling 4-8666	France Franc .0392 (1)	Italy Lira .0526 (2)	Australia (Pound) 4-8666	Germany Reichsmark .2382	Japan Yen .4985	Union of S. Africa (Pound) 4-8666
1936	\$	\$	\$	\$	\$	\$	\$	\$
January.....	1-0005	4-9657	.0663	.0803	3-9726	.4041	.2901	4-9595
February.....	.9986	4-9940	.0667	.0803	3-9952	.4063	.2910	4-9880
March.....	1-0013	4-9783	.0664	.0800	3-9827	.4050	.2900	4-9721
April.....	1-0047	4-9673	.0662	.0794	3-9735	.4043	.2902	4-9590
May.....	1-0018	4-9798	.0660	.0787	3-9838	.4036	.2912	4-9736
June.....	1-0026	5-0328	.0661	.0789	4-0262	.4038	.2948	5-0265
July.....	1-0008	5-0269	.0663	.0789	4-0215	.4036	.2935	5-0206
August.....	1-0001	5-0265	.0659	.0787	4-0210	.4023	.2941	5-0202
September.....	.9997	5-0390	.0647	.0786	4-0312	.4010	.2946	5-0327
October.....	.9997	4-8972	.0467	.0545	3-9178	.4019	.2860	4-8911
November.....	.9986	4-8817	.0464	.0525	3-9054	.4017	.2849	4-8760
December.....	.9993	4-9030	.0466	.0526	3-8820	.4019	.2849	4-8964

(1) French franc devalued September 26—New Gold content temporarily established between 43 to 49 milligrammes.

(2) Italian lira devalued by 40-93 p.c. October 5.

Holland abandoned gold standard September 26.

Prices (Non-Ferrous Metals).—

Copper.—An upward movement in copper, gained momentum in the latter half of 1936 and particularly towards the final months of the year. In the United Kingdom a rise of over 40 p.c. in cash quotations for standard copper, represented the greatest annual gain recorded in any peace time period. Production was closely controlled, and world stocks declined from 487,955 short tons to 458,914 short tons during the first six months. Meanwhile consumption increased and on August 1, the quotas of countries assenting to the curtailment agreement, were raised 5 p.c. to 75 p.c. of standard tonnages. Subsequently there came a wave of speculative buying in which European interests were prominent, and production allocations were advanced to 80 p.c. on October 1, 85 p.c. on October 15, 95 p.c. on November 1 and 105 p.c. on November 5, at which level they rested for the remainder of the year. London led the rising market and its gains were followed closely in the United States where spot copper closed at 12c. per pound Connecticut Valley basis as compared with an opening price of 9½c. World stocks at the close of December stood at 150,000 long tons or 55,000 tons below stocks at the end of the previous year. The Canadian index for electrolytic copper moved almost steadily forward from 58.9 in January to 73.3 in December. The average for the year was 63.9 as compared with 53.8 in 1935.

Tin.—The course of tin prices was affected materially by the progress made towards the resumption of the restriction agreement which had lapsed at the end of 1935. The price at Toronto opened at 52¼ cents, reached 54 cents in March, had dropped back to 48¾ cents by June, but closed the year at 58 cents after touching 59 cents per pound in November. World output had been restricted to 90 p.c. of standard tonnages at the beginning of the year but in the second quarter, quotas were reduced to 85 p.c. On June 25, they were restored to a 90 p.c. basis and markets weakened, but strengthened later when it was understood that the new allowance did not include Bolivia, which had showed a deficit in deliveries of 10,000 tons by mid-year. Later, a five year agreement was announced which included a retroactive increase of 15 p.c. for fourth quarter operations, Bolivia operating at 90 p.c. and other signatory countries at 105 p.c. of standard tonnages. Consumption during the year totalled 154,000 long tons compared with 142,500 long tons in 1935.

Silver.—Fluctuations in silver in the New York market were narrow with quotations remaining unusually stable throughout the year. The market opened at 49¾ cents per ounce which proved to be high for the year, fell to a low of 44¾ cents on January 20, a level which obtained for all months other than April, May, November and December. Open market purchases by the United States government aggregated 317,700,000 fine ounces in 1936 compared with 489,400,000 fine ounces in 1935. An index for fine silver fluctuated between 70.0 and 76.3 with the 1936 average of 72.6 approximately 43 p.c. below 1935.

Lead.—Considerable improvement both in prices and statistical position was shown for lead in 1936. Demand steadily increased and London cash prices moved up more than 80 p.c. during the year, from £15 10s. in January to £28 10s. per long ton in December. In the United States

the rise was less noteworthy and quotations in the New York market mounted from 4½ cents to 6 cents per pound during the same interval. World output had been restricted by an informal understanding since July 1935, but in August 1936, this arrangement was cancelled. Quotations for domestic lead at Montreal opened the year at \$4.36 and by June had fallen to \$4.09 per cwt. Advances during the latter half of the year brought lead to \$6.25 in December. Averages for 1935 and 1936 were \$3.93 and \$4.64 per cwt. respectively.

Zinc.—Early in the year, it appeared as if 1936 production might considerably exceed consumption, and prices at London moved down irregularly from £14 5s. in January to a low for the year of £13 3½s. on July 8. Negotiations for the re-establishment of a cartel agreement continued from October 1935 to the middle of 1936, but at the outbreak of trouble in Spain, discussions were abandoned. Speculators became active in the market in the latter part of the year and prices advanced, registering a total gain for the year of £6. In the United States, consumption at 500,000 long tons was 80,000 tons more than in 1935 while the United Kingdom showed a gain of only 15,000 long tons. Domestic zinc prices advanced irregularly from \$4.22 in January to \$4.77 per cwt. in December, with an average for the year of \$4.15 or 26 cents per cwt. higher than in the previous year.—(*Internal Trade Branch.*)

Table 5.—Metal Prices, 1932-1936

Metal	Market	Unit	1932	1933	1934	1935	1936
		\$	\$	\$	\$	\$	\$
Antimony (ordinaries).....	New York.....	Pound.....	0-05592	0-06528	0-08901	0-13616	0-12240
Arsenic, white (nominal).....	New York.....	Pound.....	0-04	0-04	0-04	0-035	0-035
Cobalt (nominal).....	New York.....	Pound.....	2-50	2-50	2-50	2-50	2-50
Cobalt Oxide (nominal).....	New York.....	Pound.....	1-35	1-35	1-35	1-37	1-38
	(New York.....	Pound.....	0-05555	0-07025	0-08428	0-08649	0-09474
Copper.....	Montreal.....	Pound.....	0-07516	0-08684	0-0822	0-08488	0-10070
	(London.....	Long ton.....	35-962	36-359	33-319	35-430	42-650
Gold (in Canadian funds).....		Fine oz.....	23-47	28-60	34-50	35-19	35-03
	New York.....	Pound.....	0-03180	0-03869	0-03860	0-04065	0-04710
Lead.....	Montreal.....	Pound.....	0-03511	0-03705	0-04488	0-03925	0-04642
	(London.....	Long ton.....	11-913	11-670	10-935	14-238	17-599
Nickel.....	New York.....	Pound.....	0-35	0-35	0-35	0-35	0-35
Platinum.....	New York.....	Fine oz.....	*10-104	*7-630	*7-75	*7-325	*8-138
Silver.....	New York.....	Fine oz.....	0-27892	0-34727	0-47973	0-64273	0-45087
Tin.....	New York.....	Pound.....	0-22017	0-39110	0-52191	0-50420	0-46441
	(St. Louis.....	Pound.....	0-02876	0-04029	0-04158	0-04328	0-04901
Zinc.....	Montreal.....	Pound.....	0-03724	0-04488	0-04059	0-03992	0-04153
	(London.....	Long ton.....	13-545	15-666	13-657	14-082	14-920

NOTE.—All prices in dollars per unit, excepting London copper, lead and zinc prices which are quoted in pounds sterling per long ton.

* Prices for platinum are quoted in pounds sterling per fine ounce.

Table 6.—Annual Values of the Mineral Production of Canada since 1886

Year	Value of production	Value per capita	Year	Value of production	Value per capita
	\$	\$		\$	\$
1886.....	10,221,255	2-23	1912.....	135,048,296	18-33
1887.....	10,321,331	2-23	1913.....	145,634,812	19-35
1888.....	12,518,894	2-67	1914.....	128,863,075	16-75
1889.....	14,013,113	2-96	1915.....	137,109,171	17-44
1890.....	16,763,353	3-50	1916.....	177,201,534	22-05
1891.....	18,976,616	3-92	1917.....	189,646,821	23-18
1892.....	16,623,415	3-39	1918.....	211,301,897	25-37
1893.....	20,035,082	4-04	1919.....	176,686,390	20-84
1894.....	19,931,158	3-98	1920.....	227,859,665	26-40
1895.....	20,505,917	4-05	1921.....	171,923,342	19-56
1896.....	22,474,256	4-38	1922.....	184,297,242	20-55
1897.....	28,485,023	5-49	1923.....	214,079,331	23-41
1898.....	38,412,431	7-32	1924.....	209,583,406	22-71
1899.....	49,234,005	9-27	1925.....	226,583,353	24-19
1900.....	64,420,877	12-04	1926.....	240,437,123	25-61
1901.....	65,797,911	12-16	1927.....	247,356,695	25-67
1902.....	63,231,836	11-36	1928.....	274,989,487	27-96
1903.....	61,740,513	10-83	1929.....	310,850,246	31-00
1904.....	60,082,771	10-27	1930.....	279,873,578	27-42
1905.....	69,078,999	11-49	1931.....	230,434,726	22-21
1906.....	79,286,697	12-81	1932.....	191,228,225	18-20
1907.....	86,865,202	13-75	1933.....	221,495,253	20-74
1908.....	85,557,101	13-16	1934.....	278,161,590	25-67
1909.....	91,831,441	13-70	1935.....	312,344,457	28-56
1910.....	106,823,623	14-93	1936.....	361,919,372	32-82
1911.....	103,220,994	14-32			

Table 7.—Annual Values of the Mineral Production of Canada, by Classes, since 1907

Year	Metallics	Non-Metallics		Total	Year	Metallics	Non-Metallics		Total
		Fuels and other non-metallics	Structural materials and clay products				Fuels and other non-metallics	Structural materials and clay products	
	\$	\$	\$	\$		\$	\$	\$	\$
1907...	42,426,607	31,275,546	12,863,049	(a) 86,865,202	1922....	61,785,707	82,976,794	39,534,741	184,297,242
1908...	41,774,362	32,142,784	11,339,955	(a) 85,557,101	1923....	84,391,218	91,936,732	37,751,381	214,079,331
1909...	44,156,841	31,141,251	16,533,349	91,831,441	1924....	102,406,528	71,796,009	35,380,869	209,583,406
1910...	49,438,873	37,757,158	19,627,592	106,823,623	1925....	117,082,298	71,851,801	37,649,234	226,583,333
1911...	46,105,423	34,405,960	22,709,611	103,220,994	1926....	115,237,581	85,240,144	39,959,398	240,437,123
1912...	61,172,753	45,080,674	28,794,869	135,048,296	1927....	113,561,080	88,986,246	44,809,419	247,356,695
1913...	66,361,351	48,463,709	30,809,752	145,634,812	1928....	132,012,454	93,239,552	49,737,181	274,989,487
1914...	59,386,619	43,467,229	26,009,227	128,863,075	1929....	154,454,056	97,861,356	58,534,834	310,850,246
1915...	75,814,841	43,373,571	17,920,759	137,109,171	1930....	142,745,704	83,402,349	53,727,465	279,873,578
1916...	106,319,365	53,414,983	17,467,186	177,201,534	1931....	120,930,147	65,546,284	44,158,295	230,434,726
1917...	106,455,147	63,354,363	19,837,311	189,646,821	1932....	112,041,763	56,788,179	22,398,283	191,228,225
1918...	114,549,152	77,621,946	19,130,799	211,301,897	1933....	147,015,593	57,782,973	16,696,687	221,495,253
1919...	73,262,793	76,002,087	27,421,510	176,686,390	1934....	194,110,968	64,763,861	19,286,761	278,161,590
1920...	77,939,630	108,027,947	41,892,088	227,859,665	1935....	221,800,849	67,328,208	23,215,400	312,344,457
1921...	49,343,232	87,842,682	34,737,428	171,923,342	1936....	259,425,194	76,723,437	25,770,741	361,919,372

(a) Total includes \$300,000 allowed for products not reported.

Table 8.—Values of the Mineral Production of Canada, by Provinces, since 1899

Year	Nova Scotia	New Brunswick	Quebec	Ontario	Manitoba	Saskatchewan	Alberta	British Columbia	Yukon*
	\$	\$	\$	\$	\$	\$	\$	\$	\$
1899..	6,817,274	420,227	2,585,635	9,819,557		17,108,707		12,482,605	Included with
1900..	9,298,479	439,060	3,292,383	11,258,099		23,452,330		16,680,526	Mani-
1901..	7,770,159	467,985	3,759,984	13,970,010		19,297,940		20,531,833	toba,
1902..	10,686,549	607,129	3,743,636	14,619,091		16,127,400		17,448,031	Saskat-
1903..	11,431,914	580,495	3,585,938	14,160,033		14,082,986		17,899,147	chewan
1904..	11,212,746	559,913	3,688,482	12,582,843		12,713,613		19,325,174	and
1905..	11,507,047	559,035	4,405,975	18,833,292		11,387,642		22,386,008	Alberta
1906..	12,894,303	646,328	5,242,058	25,111,682		10,092,726		25,299,600	
1907..	14,532,040	664,467	6,205,553	30,381,638	898,775	533,251	4,657,524	25,656,056	3,335,898
1908..	14,487,108	579,816	6,372,949	30,623,812	584,374	413,212	5,122,505	23,704,035	3,669,290
1909..	12,504,810	657,035	7,086,265	37,374,577	1,193,377	456,246	6,047,447	22,479,062	4,032,678
1910..	14,195,730	551,942	8,270,136	43,538,078	1,500,359	498,122	8,996,210	24,478,572	4,764,474
1911..	15,409,397	612,830	9,304,717	42,796,162	1,791,772	636,706	6,662,673	21,299,305	4,707,432
1912..	18,922,236	771,004	11,065,998	51,985,876	2,463,074	1,165,642	12,073,589	30,076,635	5,933,242
1913..	19,376,138	1,102,613	13,475,534	59,167,749	2,214,496	881,142	15,054,046	28,086,312	6,276,737
1914..	17,584,639	1,014,570	11,896,929	53,034,677	2,413,489	712,313	12,684,234	24,164,039	5,418,185
1915..	18,083,342	903,467	11,619,275	61,071,287	1,318,387	451,933	9,909,347	28,689,425	5,057,708
1916..	20,042,262	1,118,187	14,406,598	80,461,323	1,823,576	590,473	13,297,543	39,969,962	5,491,610
1917..	21,104,542	1,435,024	17,400,077	89,066,600	2,628,264	860,651	16,527,535	36,141,926	4,482,202
1918..	22,317,108	2,144,017	19,605,347	94,694,093	3,120,609	1,019,781	23,109,987	42,935,333	3,355,631
1919..	23,445,215	2,770,945	21,267,947	67,917,998	2,868,378	1,521,964	21,087,582	34,865,427	1,940,934
1920..	34,130,017	2,491,737	28,886,214	81,715,808	4,223,461	1,837,468	33,586,456	39,411,728	1,756,726
1921..	28,912,111	1,901,505	15,157,094	57,356,651	1,934,117	1,114,220	30,562,229	33,230,460	1,754,955
1922..	25,923,499	2,263,692	17,647,939	65,806,029	2,258,942	1,255,470	27,872,136	39,423,962	1,785,573
1923..	29,648,893	2,462,457	20,308,763	80,825,851	1,768,397	1,047,583	31,287,536	43,757,388	2,972,823
1924..	23,820,352	1,969,260	19,136,504	86,398,656	1,534,249	1,128,100	22,344,940	52,298,533	952,812
1925..	17,625,612	1,743,858	24,284,527	87,980,436	2,276,759	1,076,392	25,318,866	64,485,242	1,791,641
1926..	25,873,792	1,811,104	25,956,193	84,702,296	3,073,528	1,193,394	26,977,027	65,622,976	2,226,813
1927..	30,111,221	2,148,635	28,870,403	99,952,962	2,888,912	1,455,225	29,309,222	60,801,170	1,789,044
1928..	30,524,392	2,198,919	37,037,420	117,662,505	4,186,853	1,719,461	32,531,416	64,496,351	2,709,957
1929..	30,904,453	2,439,072	46,358,285	117,662,505	5,423,825	2,253,506	34,739,986	68,162,878	2,905,736
1930..	27,019,367	2,383,571	41,215,220	113,530,978	5,453,182	2,368,612	30,427,742	54,953,320	2,521,588
1931..	21,081,157	2,176,910	35,964,537	97,975,915	9,058,365	1,931,880	23,580,901	35,480,701	2,184,917
1932..	16,201,279	2,223,505	25,638,466	85,910,030	10,058,365	1,681,728	21,174,061	27,326,173	2,014,618
1933..	16,966,183	2,107,682	28,141,482	110,205,021	9,026,951	2,477,425	19,702,953	30,794,604	2,073,052
1934..	23,310,729	2,156,151	31,269,945	145,565,871	9,776,934	2,977,061	20,228,851	41,206,965	1,669,083
1935..	23,183,128	2,821,027	39,124,696	158,934,269	12,052,417	3,816,943	22,289,681	48,692,050	1,430,246
1936..	26,672,278	2,587,891	49,736,919	184,532,892	11,315,527	6,970,397	23,308,726	54,407,036	2,390,706

* Includes a relatively small production from the Northwest Territories since 1932.

Table 9.—Percentage of the Total Value of the Mineral Production of Canada, by Provinces, 1931-1936

Province	1931	1932	1933	1934	1935	1936
Nova Scotia.....	9.24	8.9	7.7	8.4	7.4	7.4
New Brunswick.....	0.96	1.2	0.9	0.8	0.9	0.7
Quebec.....	15.65	13.4	12.7	11.2	12.5	13.8
Ontario.....	42.15	43.5	49.8	52.3	50.9	51.0
Manitoba.....	4.37	4.8	4.1	3.5	3.9	3.1
Saskatchewan.....	0.85	0.9	1.1	1.1	1.2	1.9
Alberta.....	10.34	11.6	8.9	7.3	7.1	6.4
British Columbia.....	15.50	14.7	13.9	14.8	15.6	15.0
*Yukon.....	0.94	1.0	0.9	0.6	0.5	0.7
Canada.....	100.00	100.00	100.00	100.00	100.00	100.00

* Includes small production from the Northwest Territories since 1932.

NOTE.—In the following provincial tables the value of gold includes the exchange equalization. For further information on the price of gold see Chapter II.

Table 10.—Mineral Production of Nova Scotia,* 1934-1936

Product	1934		1935		1936	
	Quantity	Value	Quantity	Value	Quantity	Value
METALLICS—		\$		\$		\$
Copper..... Pound					779,307	73,855
Gold..... fine oz.	3,525	121,613	9,376	329,942	11,960	418,959
Lead..... pound					1,901,712	74,414
Silver..... fine oz.	321	152	372	241	107,642	48,576
Zinc..... pound					6,180,219	204,874
NON-METALLICS—						
Coal..... tons	6,341,625	21,860,093	5,822,075	20,391,227	6,649,102	22,973,281
Diatomite..... tons	1,320	52,800	666	26,660	565	11,300
Grindstones..... tons	50	1,762	50	2,006	70	2,242
Gypsum..... tons	378,287	488,044	454,703	523,216	729,019	808,294
Quartz..... tons	7,292	12,107	9,640	13,978	6,764	10,819
Salt..... tons	42,886	191,917	38,701	161,659	38,774	183,915
Silica brick..... M	2,159	71,215	1,968	73,218	1,922	70,570
CLAY PRODUCTS AND OTHER STRUCTURAL MATERIALS—						
Clay products..... tons		157,158		270,478		355,254
Lime—						
Quicklime..... tons	8,298	63,630	10,998	80,408	15,163	113,569
Hydrated..... tons	622	4,324	333	2,290	501	5,661
Sand and gravel..... tons	256,572	114,597	1,423,557	685,973	1,947,471 (a)	941,366
Stone..... tons	123,068	171,317	212,465	621,832	254,572	375,329
Total.....		23,310,729		23,183,128		26,672,278

* In 1935, 203,002 long tons of pig iron were produced in Nova Scotia from Newfoundland ores; production in 1934 totalled 133,360 long tons and in 1936—257,148 long tons.

(a) Includes 17,975 tons worth \$2,663 produced in Prince Edward Island.

Table 11.—Mineral Production of New Brunswick, 1934-1936

	1934		1935		1936	
	Quantity	Value	Quantity	Value	Quantity	Value
		\$		\$		\$
METALLICS—						
Manganese ore..... tons			100	800	221	1,596
Non-METALLICS—						
Coal..... tons	314,750	1,026,343	348,024	1,129,019	368,618	1,190,032
Grindstones..... tons	535	27,091	456	21,175	412	17,982
Gypsum..... tons	30,398	104,709	30,796	105,960	38,470	123,560
Natural gas..... M cu. ft.	625,601	306,005	615,454	303,886	606,246	298,819
Petroleum..... brls.	11,106	22,277	12,954	18,230	17,112	24,075
CLAY PRODUCTS AND OTHER STRUCTURAL MATERIALS—						
Clay products.....		59,897		62,478		102,256
Lime—						
Quicklime..... tons	8,949	76,132	9,569	74,721	11,004	80,173
Hydrated..... tons	6,803	50,277	6,703	50,054	6,838	47,843
Sand and gravel..... tons	588,064	322,238	1,813,206	845,981	970,945	567,797
Stone..... tons	37,918	161,182	85,144	208,723	59,431	133,758
Total.....		2,156,151		2,821,027		2,587,891

Table 12.—Mineral Production of Quebec, * 1934-1936

Product	1934		1935		1936	
	Quantity	Value	Quantity	Value	Quantity	Value
		\$		\$		\$
METALLICS—						
Chromite..... tons	71	1,098	346	5,371	545	8,508
Copper..... lb.	73,968,545	5,487,948	79,050,906	6,162,350	66,340,175	6,287,058
Gold..... fine oz.	390,097	13,458,347	470,552	16,558,725	666,905	23,361,683
Lead..... lb.			2,047,624	64,156	2,047,689	80,126
Selenium..... lb.	48,764	73,146	206,421	396,328	168,417	298,098
Silver..... fine oz.	470,254	223,187	668,836	433,358	724,339	326,872
Tellurium..... lb.			1,708	3,416	19,502	34,519
Titanium ore, sold for export..... tons	2,023	14,161	2,288	16,400	2,566	18,318
Zinc..... lb.			5,322,844	164,955	6,896,123	228,606
Non-METALLICS—						
Asbestos..... tons	155,980	4,936,326	210,467	7,054,614	301,287	9,958,183
Feldspar..... tons	9,207	78,853	7,002	63,075	8,115	75,703
Graphite..... tons	129	6,426	21	1,281		
Iron oxides (ochre)..... tons	4,798	64,566	5,357	75,388	5,458	65,630
Magnetitic dolomite.....		382,927		486,084		768,742
Mica..... tons	322	85,967	373	74,894	272	63,123
Natural mineral waters..... imp. gal.	75,665	16,116	126,616	16,113	131,186	17,399
Peat..... tons						255
Phosphate..... tons	81	683	116	1,043	525	4,927
Quartz..... tons	57,208	229,817	51,948	226,839	78,975	320,634
Sulphur..... tons	4,908	50,398	7,370	47,779	43,084	232,743
Soapstone.....		44,297		32,053		32,770
CLAY PRODUCTS AND OTHER STRUCTURAL MATERIALS—						
Cement..... brls.	1,613,641	2,294,847	1,751,012	2,472,008	2,093,130	2,945,074
Clay products.....		632,322		593,162		691,765
Lime—						
Quicklime..... tons	85,106	510,614	91,086	545,956	99,311	592,833
Hydrated lime..... tons	23,584	121,370	25,387	132,910	33,943	125,752
Sand and gravel..... tons	3,672,582	980,454	5,268,987	1,442,468	5,490,280	1,418,231
Stone..... tons	1,199,152	1,575,617	1,390,517	2,053,761	1,513,249	1,728,512
Slate..... tons	306	458	819	1,229	803	855
Total.....		31,269,945		39,124,696		49,736,919

*There is also in this province an important production of aluminium from imported ores.

Table 13.—Mineral Production of Ontario,* 1934-1936

Products	1934		1935		1936	
	Quantity	Value	Quantity	Value	Quantity	Value
		\$		\$		\$
METALLICS—						
Arsenic (As ₂ O ₃)..... lb.	1,647,513	56,412	2,558,789	75,326	1,365,606	42,491
Bismuth..... lb.	7,552	3,444	7,079	6,796	3,552	3,516
Chromite..... tons	40	480	.....	9,576	.....	5,070
Cobalt..... lb.	594,671	592,497	681,419	512,705	887,591	804,676
Copper..... lb.	205,059,539	14,822,704	252,027,928	19,295,965	287,914,078	26,898,920
Gold..... fine oz.	2,105,339	72,634,195	2,220,336	78,133,624	2,378,503	83,318,960
Lead..... lb.	21,558	525	22,532	706	17,442	683
Nickel..... lb.	128,687,340	32,139,425	138,516,240	35,345,103	169,739,393	43,876,525
Palladium, Rhodium, etc..... fine oz.	83,932	1,699,282	84,772	1,962,937	103,671	2,483,075
Platinum..... fine oz.	116,177	4,488,712	105,335	3,444,455	131,551	5,319,922
Selenium..... lb.	51,574	91,286	75,363	144,697	106,300	188,151
Silver..... fine oz.	5,321,160	2,525,470	5,161,651	3,344,229	5,219,366	2,355,343
Tellurium..... lb.	5,130	25,599	14,275	28,550	10,197	18,049
NON-METALLICS—						
Actinolite..... tons	30	365	.....	.....	.....	.....
Diatomite..... tons	46	1,920	100	4,600	40	2,000
Feldspar..... tons	7,302	61,665	8,656	75,003	8,409	70,840
Fluorspar..... tons	150	2,100	75	900	75	900
Graphite..... tons	1,389	64,998	1,761	78,500	.....	88,812
Gypsum..... tons	33,234	141,389	38,247	164,807	40,191	182,783
Mica..... tons	618	9,059	255	7,144	529	11,433
Natural mineral waters..... imp. gal.	21,775	1,622	19,900	1,477	23,100	1,117
Natural gas..... M cu. ft.	7,682,851	4,741,368	8,158,825	4,938,084	10,006,743	6,052,294
Nepheline-syenite..... \$	.....	.....	.....	.....	.....	37,426
Peat..... tons	1,878	7,343	1,340	5,761	1,296	7,121
Petroleum..... brls.	141,385	299,874	165,041	346,156	165,495	350,767
Phosphate..... tons	.....	.....	70	60	.....	.....
Quartz..... tons	89,838	134,572	83,034	120,005	(a)884,585	216,037
Salt..... tons	276,751	1,734,196	320,003	1,698,508	350,044	1,557,078
Silica brick..... M	369	14,730	493	22,976	471	26,715
Sulphur†..... tons	14,598	145,980	13,292	132,920	14,152	141,520
Talc..... tons	13,934	135,978	13,710	138,161	14,461	143,701
CLAY PRODUCTS AND OTHER STRUCTURAL MATERIALS—						
Cement..... brls.	1,702,128	2,403,590	1,243,836	1,752,148	1,542,463	2,150,895
Clay products.....	.....	1,261,006	.....	1,370,225	.....	1,573,936
Lime—						
Quicklime..... tons	168,760	1,287,251	196,761	1,470,721	219,943	1,674,851
Hydrated..... tons	22,251	249,038	23,379	226,146	26,650	271,209
Sand and gravel..... tons	7,880,959	1,821,689	8,770,117	2,211,406	8,498,153	2,227,620
Stone..... tons	2,460,300	1,965,507	2,122,941	1,863,892	2,706,420	2,396,376
Slate..... tons	120	600	.....	.....	260	2,080
Total..... \$	.....	145,565,871	.....	158,934,269	.....	184,532,892

*The total production of blast-furnace pig-iron in Ontario in 1936, was 421,083 long tons, 1934, it was 271,635 long tons and in 1935, it was 391,873 long tons.

†Sulphur content of pyrites shipped and estimated sulphur salvaged from smelter gases.

(a) Includes low grade silica sand for fluxing purposes.

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Table 14.—Mineral Production of Manitoba, 1934-1936

Products	1934		1935		1936	
	Quantity	Value	Quantity	Value	Quantity	Value
		\$		\$		\$
METALLICS—						
Cadmium..... lb.					148,133	131,838
Copper..... lb.	30,867,141	2,290,126	38,011,371	2,963,146	29,853,220	2,829,190
Gold..... fine oz.	132,321	4,565,075	142,613	5,018,551	139,273	4,878,733
Lead..... lb.			19,179	601		
Selenium..... lb.	4,127	6,190	65,074	124,942	50,760	89,845
Silver..... fine oz.	1,252,920	594,647	1,206,454	781,660	791,489	357,175
Tellurium..... lb.			340	680	3,928	6,953
Zinc..... lb.	47,264,342	1,438,538	51,129,980	1,584,513	36,744,951	1,218,095
Non-METALLICS—						
Coal..... tons	4,113	8,952	3,106	7,408	4,029	9,525
Feldspar..... tons	1,793	6,763	2,084	6,252	1,322	7,932
Gypsum..... tons	9,657	81,553	10,500	85,885	12,064	87,076
Natural gas..... M cu. ft.	600	180	600	180	600	180
Quartz..... tons	931	3,031	147	220	90	45
Salt..... tons	1,664	20,137	1,538	18,765	2,498	32,151
CLAY PRODUCTS AND OTHER STRUCTURAL MATERIALS—						
Cement..... brls.	181,166	411,247	266,457	604,857	348,042	783,095
Clay products.....		37,916		74,755		55,564
Lime—						
Quicklime..... tons	12,988	100,958	14,594	115,149	17,314	133,227
Hydrated..... tons	3,580	62,550	4,021	70,368	4,446	77,808
Sand and gravel..... tons	334,026	95,426	1,399,659	404,730	1,852,606	545,130
Stone..... tons	43,127	53,545	146,614	189,755	49,506	71,965
Total..... \$		9,776,934		12,052,417		11,315,527

Table 15.—Mineral Production of Saskatchewan, 1934-1936

Products	1934		1935		1936	
	Quantity	Value	Quantity	Value	Quantity	Value
		\$		\$		\$
METALLICS—						
Cadmium..... lb.					111,749	99,457
Copper..... lb.	6,618,913	491,077	11,429,452	890,974	14,971,609	1,418,859
Gold..... fine oz.	5,405	186,472	14,323	504,026	48,981	1,715,804
Selenium..... lb.	459	689	19,567	37,569	25,380	44,923
Silver..... fine oz.	87,551	41,552	201,608	130,622	642,497	289,940
Tellurium..... lb.			102	204	1,964	3,476
Zinc..... lb.	2,162,938	65,831	8,974,720	278,126	27,692,869	918,019
Coal..... tons	909,288	1,241,130	921,785	1,293,668	1,020,792	1,463,680
Quartz†..... tons	92,447	88,748	77,177	59,069	76,089	49,458
Salt..... tons	452	8,703	101	2,046		
Sodium sulphate..... tons	66,821	587,986	44,817	343,764	76,598	552,681
Volcanic dust..... tons	1	20				
Natural gas..... M cu.ft.	13,781	4,823	75,558	7,555	90,839	33,985
CLAY PRODUCTS AND OTHER STRUCTURAL MATERIALS—						
Clay products.....		90,997		98,150		95,584
Sand and gravel..... tons	533,575	169,033	502,732	171,170	716,910	284,531
Total..... \$		2,977,061		3,816,943		6,970,397

† Low grade silica sand for fluxing purposes.

Table 16.—Mineral Production of Alberta, 1934-1936

Products	1934		1935		1936	
	Quantity	Value	Quantity	Value	Quantity	Value
		\$		\$		\$
METALLICS—						
Gold.....fine oz.	393	13,558	150	5,279	109	3,818
Silver.....fine oz.	35	17	16	10	9	4
Non-METALLICS—						
Bituminous sands..... tons	862	3,449	40	160		
Coal..... tons	4,753,810	12,556,099	5,462,894	14,094,795	5,696,960	14,659,705
Natural gas..... M cu.ft.	14,841,491	3,707,276	16,060,349	4,113,436	17,407,820	4,376,720
Petroleum..... brls.	1,253,966	3,104,823	1,263,510	3,102,227	1,312,368	3,019,930
CLAY PRODUCTS AND OTHER STRUCTURAL MATERIALS—						
Cement..... brls.	163,946	326,253	219,555	436,914	243,534	482,197
Clay products.....		246,677		326,679		315,777
Lime—						
Quicklime..... tons	7,300	64,143	6,354	54,803	8,879	75,756
Hydrated..... tons	155	1,554	230	2,305	250	2,503
Sand and gravel..... tons	650,232	196,898	653,511	146,092	894,380	339,928
Stone..... tons	2,737	8,104	2,242	6,981	13,916	29,388
Total..... \$		20,228,851		22,289,681		23,305,726

Table 17.—Mineral Production of British Columbia, 1934-1936

Products	1934		1935		1936	
	Quantity	Value	Quantity	Value	Quantity	Value
		\$		\$		\$
METALLICS(a)—						
Bismuth..... lb.	246,092	297,771	6,718	6,449	360,613	357,007
Cadmium..... lb.		95,665	580,530	441,203	526,034	468,170
Copper..... lb.	48,246,924	3,579,583	38,478,043	2,999,525	21,169,343	2,006,219
Gold..... fine oz.	296,196	10,218,762	391,633	13,781,565	451,938	15,831,388
Lead..... lb.	344,467,138	8,392,597	336,784,326	10,552,059	376,645,367	14,738,133
Platinum..... fine oz.	53	2,051	39	1,275	20	809
Silver..... fine oz.	8,729,721	4,143,204	9,178,400	5,946,677	9,748,715	4,399,303
Zinc..... lb.	249,152,403	7,583,202	255,222,315	7,909,314	255,668,574	8,475,413
Non-METALLICS—						
Coal..... tons	5,485,969	5,351,108	1,331,287	5,043,510	1,489,171	5,493,425
Diatomite..... tons	6	190	57	1,880	10	350
Grindstones, pulpstones..... tons	402	17,625	202	10,829	87	4,500
Gypsum..... tons	9,661	48,081	7,618	52,335	14,078	77,258
Iron oxides (ochre)..... tons	161	1,600	159	1,687	396	4,000
Magnesium Sulphate..... tons	42	1,100	340	7,965	654	13,712
Mica..... tons	57	2,045				
Phosphate..... tons						
Quartz..... tons	24,847	13,990	11,056	4,771	146	788
Sodium carbonate..... tons	244	1,920	242	2,430	192	1,677
Sulphur*..... tons	32,031	319,124	46,784	453,536	64,896	608,792
Talc..... tons	25	502	93	1,318	47	799
Volcanic dust..... tons	30	600				
CLAY PRODUCTS AND OTHER STRUCTURAL MATERIALS—						
Cement..... brls.	122,345	232,009	167,226	314,116	281,549	516,931
Clay products.....		194,437		216,636		280,891
Lime—						
Quicklime..... tons	16,721	135,628	12,685	83,664	19,885	119,563
Hydrated..... tons	2,966	18,328	3,319	16,296	4,274	15,222
Sand and gravel..... tons	958,149	335,142	1,381,720	481,620	1,753,415	596,796
Slate..... tons	312	3,744	310	3,100	184	2,479
Stone..... tons	210,714	217,057	356,895	358,290	384,571	393,411
Total..... \$		41,206,965		48,692,050		54,407,036

* Includes sulphur content of pyrites shipped and estimated sulphur contained in sulphuric acid made from waste smelter gases.

(a) In addition crude nickel ore was mined and exported to Japan.—Data not available.

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Table 18.—Mineral Production of Yukon, 1934-1936

Products	1934		1935		1936	
	Quantity	Value	Quantity	Value	Quantity	Value
METALLICS—		\$		\$		\$
Gold..... fine oz.	38,798	1,338,531	35,707	1,256,529	50,358	1,764,041
Lead..... lb.	1,783,349	43,450	218,513	6,846	2,568,699	100,513
Silver..... fine oz.	515,542	244,681	54,715	35,450	783,416	353,532
NON-METALLICS—						
Coal..... tons	638	2,217	835	3,483	510	2,286
Total..... \$		1,628,879		1,302,308		2,220,372

Table 19.—Mineral Production of Northwest Territories, 1934-1936

Products	1934		1935*		1936*	
	Quantity	Value	Quantity	Value	Quantity	Value
Gold..... oz.		\$	200	\$ 7,038	1	\$ 35
Radium and Uranium products.....		Not available for publication				
Lead..... lb.	3,531	86	12,905	404		
Natural gas..... M cu. ft.					1,100	245
Silver..... fine oz.	37,778	17,930	146,506	94,921	317,014	143,059
Petroleum, crude..... brls.	4,438	22,188	5,115	25,575	5,399	26,995
Total..... \$		40,204		127,938		170,334

* During 1934 the Port Hope (Ontario) refinery of Eldorado Gold Mines, Ltd., received from the Eldorado mine at Great Bear Lake, N.W.T., 77 tons of pitchblende and silver ore and seven tons of concentrates. Twenty-six tons of ore were treated during the year with recovery of radium, uranium, silver and lead amounting to \$210,000. During 1935 the mill at the mine treated 14,402 tons of ore; pitchblende and silver concentrates totalled 296 tons valued at \$752,918; during 1935 recovery at the Port Hope refinery of radium, uranium, silver and lead amounted to about \$490,000. In 1936 flotation and other concentrates together with cobbled ore produced totalled 401.5 tons with a gross value of \$1,349,388; shipments from the mine consisted of 326.5 tons of pitchblende concentrate to the Port Hope, Ontario, refinery and 40.5 tons of copper-silver concentrate to Tacoma, Washington, U.S.A.

Table 20.—Principal Statistics of the Mineral Industry in Canada, by Industries, 1935-1936

Year	Number of active firms	Number of operating mines, oil and gas wells, quarries, gravel pits, etc.	Capital employed (excluding ore reserves or other unmined material) \$	Number of employees	Salaries and wages \$	Cost of process supplies, purchased electricity and fuel \$	Net value of bullion, ore, concentrates, residues and other minerals shipped from the mines, smelters, brick and cement plants and quarries (c) \$
Metal Mining Industry							
ALLUVIAL GOLD MINES							
1935.....	84	86	9,198,533	702	1,227,971	91,737	2,106,025
1936.....	80	85	10,965,524	853	1,519,659	166,574	2,893,981
AURIFEROUS QUARTZ MINES							
1935.....	377	384	193,728,802	19,834	31,523,907	16,594,031	75,120,774
1936.....	580	607	256,018,578	25,097	39,826,742	19,882,784	88,210,233
COPPER-GOLD-SILVER MINES							
1935.....	16	18	38,461,682	3,430	5,040,196	3,433,284	13,243,163
1936.....	26	27	40,732,717	3,738	5,473,325	3,652,068	15,619,897
SILVER-COBALT MINES							
1935.....	27	28	6,380,731	402	494,791	246,218	2,070,716
1936.....	24	25	5,946,702	363	458,546	181,592	915,376
SILVER-LEAD-ZINC MINES*							
1935.....	69	70	16,596,941	1,657	2,431,110	1,205,822	10,553,036
1936.....	88	89	19,372,600	1,870	2,917,832	1,894,495	13,814,645
NICKEL-COPPER MINES							
1935.....	4	7	26,685,284	3,552	6,059,407	3,461,632	11,030,621
1936.....	5	9	30,131,192	4,406	7,331,542	4,102,807	18,710,379
MISCELLANEOUS METAL MINES							
1935.....	12	12	733,497	82	63,612	9,300	22,847
1936.....	11	11	770,957	113	142,974	30,345	3,147
NON-FERROUS METAL SMELTING AND REFINING							
1935.....	12	14	145,686,299	8,944	12,687,356	(b)18,722,676	†59,441,583
1936.....	11	14	143,858,717	10,015	14,346,050	(b)20,603,343	†71,276,645
Total Metal Mining Industries							
1935.....	601	619	437,471,769	38,603	59,528,350	43,764,700	173,588,815
1936.....	825	867	507,796,987	46,455	72,016,670	50,514,008	211,444,303

*Contains data relating to silver ores in the Northwest Territories.

†Value added by smelting.

(b) Includes fuel and electricity used for metallurgical purposes.

(c) See footnote at end of this table.

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Table 20.—Principal Statistics of the Mineral Industry in Canada, by Industries,
1935-1936—Continued

Year	Number of active firms	Number of operating mines, oil and gas wells, quarries, gravel pits, etc.	Capital employed (excluding ore reserves or other unmined material)	Number of employees	Salaries and wages	Cost of process supplies, purchased electricity and fuel	Net value of bullion, ore, concentrates, residues and other minerals shipped from the mines, smelters, brick and cement plants and quarries (c)
			\$		\$	\$	\$
Non-Metal Mining Industries, Including Fuels							
*FUELS							
COAL							
1935.....	516	556	110,516,517	26,198	26,595,344	12,851,633	26,894,671
1936.....	516	553	109,703,043	26,918	28,873,135	8,088,154	34,852,621
NATURAL GAS							
1935.....	199	3,190	69,221,051	1,719	1,932,937	215,918	6,580,061
1936.....	227	3,253	77,666,568	2,075	2,456,918	79,034	9,062,657
PETROLEUM							
1935.....	244	2,285	33,398,894	940	1,046,046	808,500	3,217,927
1936.....	256	2,266	33,259,876	1,052	1,298,592	510,016	3,439,317
TOTAL FUELS							
1935.....	959	6,031	213,136,462	28,857	29,574,327	13,876,051	36,692,659
1936.....	999	6,072	220,669,487	30,045	32,628,645	8,677,204	47,354,596
OTHER NON-METAL MINING INDUSTRIES							
ABRASIVES—NATURAL							
1935.....	9	9	114,114	42	25,135	6,326	60,824
1936.....	8	8	77,279	30	17,442	3,528	34,846
ASBESTOS							
1935.....	8	9	16,805,583	2,072	1,904,053	2,058,451	4,996,163
1936.....	10	11	18,877,326	2,647	2,642,924	2,399,475	7,558,708
FELDSPAR AND QUARTZ							
1935.....	28	28	1,151,986	260	182,792	58,012	511,200
1936.....	34	34	1,400,024	324	238,848	160,913	628,769
GYPSUM							
1935.....	6	13	5,737,114	467	367,007	187,027	745,176
1936.....	9	14	8,954,654	514	440,297	218,869	1,060,102
IRON OXIDES (OCHRE)							
1935.....	5	5	175,935	32	26,748	12,264	64,836
1936.....	6	6	167,499	39	30,281	11,419	58,211

*Production of peat since 1929 included in the miscellaneous non-metallics.

(c) See footnote at end of this table.

Table 20.—Principal Statistics of the Mineral Industry in Canada, by Industries, 1935-1936—Continued

Year	Number of active firms	Number of operating mines, oil and gas wells, quarries, gravel pits, etc.	Capital employed (excluding ore reserves or other unmined material)	Number of employees	Salaries and wages	Cost of process supplies, purchased electricity and fuel	Net value of bullion, ore, concentrates, residues and other minerals shipped from the mines, smelters, brick and cement plants and quarries (c)
			\$		\$	\$	\$
<i>OTHER NON-METAL MINING INDUSTRIES—Concluded</i>							
MICA							
1935.....	24	24	145,557	92	45,217	695	81,343
1936.....	22	22	221,800	101	44,550	4,824	69,732
SALT							
1935.....	10	10	3,776,333	473	597,785	213,940	1,667,038
1936.....	9	9	3,856,187	506	640,644	212,697	1,560,447
TALC AND SOAPSTONE							
1935.....	8	8	639,501	94	69,803	37,411	134,121
1936.....	7	7	647,929	85	70,935	33,392	143,878
MISCELLANEOUS							
1935.....	44	44	2,555,124	366	357,837	254,948	785,784
1936.....	41	41	2,195,621	477	526,248	548,434	1,006,194
<i>TOTAL OTHER NON-METAL MINING INDUSTRIES</i>							
1935.....	142	150	31,101,247	3,898	3,676,377	2,829,074	9,046,485
1936.....	146	152	36,398,319	4,723	4,652,169	3,593,551	12,120,887
Total Non-Metal Mining Industries, Including Fuels							
1935.....	1,101	6,181	244,237,709	32,755	33,150,704	16,705,125	45,739,144
1936.....	1,145	6,224	257,057,806	34,763	37,280,814	12,270,755	59,475,482
Clay Products and Other Structural Materials							
CLAY PRODUCTS							
Brick, Tile and Sewer Pipe							
1935.....	129	136	20,144,431	1,609	1,293,159	666,163	2,127,241
1936.....	129	136	19,487,227	1,651	1,397,395	747,183	2,506,008
STONEWARE AND POTTERY							
1935.....	3	3	357,575	119	94,765	13,415	205,744
1936.....	4	4	376,204	124	100,753	19,171	198,665
<i>TOTAL CLAY PRODUCTS*</i>							
1935.....	132	139	20,502,006	1,728	1,387,924	679,578	2,332,985
1936.....	133	140	19,863,431	1,775	1,498,148	766,354	2,704,673

*Includes kaolin and other clays.

(c) See footnote at end of this table.

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Table 20.—Principal Statistics of the Mineral Industry in Canada, by Industries, 1935-1936—Concluded

Year	Number of active firms	Number of operating mines, oil and gas wells, quarries, gravel pits, etc.	Capital employed (excluding ore reserves or other unmined material)	Number of employees	Salaries and wages	Cost of process supplies, purchased electricity and fuel	Net value of bullion, ore, concentrates, residues and other minerals shipped from the mines, smelters, brick and cement plants and quarries (c)
			\$		\$	\$	\$
OTHER STRUCTURAL MATERIALS†							
CEMENT							
1935.....	4	9	52,454,004	924	1,027,416	1,621,674	3,958,369
1936.....	4	9	53,343,991	1,052	1,196,664	2,169,071	4,739,121
LIME							
1935.....	49	54	5,707,391	756	556,049	810,437	2,115,354
1936.....	52	57	6,106,901	799	640,322	839,979	2,495,991
SANDS AND GRAVEL							
1935.....	1,398	5,400	4,849,702	3,015	2,479,418	116,063	6,273,377
1936.....	1,356	5,374	2,994,127	3,638	2,090,388	101,059	6,820,340
STONE							
1935.....	372	496	12,277,518	2,475	1,950,698	734,339	4,573,224
1936.....	426	558	11,899,852	2,512	2,043,216	841,704	4,292,449
TOTAL OTHER STRUCTURAL MATERIALS							
1935.....	1,823	5,959	75,288,615	7,170	6,013,681	3,282,513	16,920,324
1936.....	1,838	5,998	74,344,871	8,001	6,970,590	3,951,813	18,547,901
Total Clay Products and Other Structural Materials							
1935.....	1,955	6,098	95,790,621	8,898	7,401,505	3,962,091	19,253,309
1936.....	1,971	6,138	94,208,302	9,776	7,468,738	4,718,167	21,052,574
GRAND TOTAL OF ALL INDUSTRIES							
1935.....	3,657	12,898	777,500,099	80,256	100,080,559	64,431,916	238,581,268
1936.....	3,941	13,229	859,063,095	90,999	116,766,222	67,502,930	291,972,359

†A considerable proportion of the values shown for lime and stone sales represents shipments for chemical purposes—see Chapter 9.

(c) The value of fuel, purchased electricity and process supplies used were deducted from the gross value of shipments for the first time in 1935; this was done in order to attain a more accurate approximation of a net value. Also the cost of ores, etc., treated in non-ferrous metallurgical plants is deducted in determining the figure "value added"; these costs were as follows: 1935, \$108,081,399; 1936, \$137,857,432.

Table 21.—Principal Statistics of the Mineral Industry in Canada, by Provinces, 1935-1936

Year	Number of operating mines, oil and gas wells, quarries, gravel pits, etc.	Capital employed (excluding ore reserves or other unmined material) \$	Number of employees	Salaries and wages \$	Cost of process supplies, purchased electricity and fuel \$ (b)	Net value of bullion, ore, concentrates, residues and other minerals shipped from the mines, smelters, brick and cement plants and quarries \$ (*)
(c) NOVA SCOTIA						
1935.....	267	53,569,182	14,550	14,301,510	7,758,899	14,207,064
1936.....	365	55,513,999	15,368	15,980,687	5,645,436	19,136,304
NEW BRUNSWICK						
1935.....	520	4,522,963	2,390	1,865,407	331,315	2,467,339
1936.....	423	5,253,829	1,744	1,248,431	242,114	2,324,747
QUEBEC						
1935.....	3,850	117,534,858	11,811	12,794,600	11,208,564	33,679,125
1936.....	4,011	140,537,708	14,225	15,774,362	13,558,660	44,823,567
ONTARIO						
1935.....	6,274	322,300,162	25,264	38,152,140	26,369,054	130,220,051
1936.....	6,297	384,535,666	31,105	46,899,805	31,529,020	151,874,462
MANITOBA						
1935.....	119	40,944,700	2,346	3,403,649	2,316,210	9,040,591
1936.....	274	41,722,791	2,932	3,752,367	2,155,048	9,366,496
SASKATCHEWAN						
1935.....	223	11,390,801	1,457	1,343,041	761,084	2,869,351
1936.....	219	14,974,371	1,828	1,937,825	993,871	5,720,747
ALBERTA						
1935.....	585	102,656,116	9,706	10,862,198	4,876,482	16,738,472
1936.....	594	104,118,831	10,376	11,850,463	2,357,005	20,104,417
BRITISH COLUMBIA						
1935.....	1,048	118,291,187	12,352	16,479,606	10,545,704	28,172,657
1936.....	1,029	103,483,250	12,827	17,908,553	10,584,950	36,694,755
YUKON (a)						
1935.....	13	6,290,130	380	878,408	264,604	1,186,593
1936.....	18	8,922,650	594	1,413,729	636,826	1,926,864
Canada						
1935.....	12,898	777,500,099	80,256	100,080,559	64,431,916	238,581,243
1936.....	13,229	859,063,095	90,999	116,766,222	67,502,930	291,972,359

Plants in provinces do not add to Canada total, owing to the fact that a plant located on the Manitoba-Saskatchewan boundary is counted but once.

*See footnote, preceding table.

(a) Contains data for the Northwest Territories.

(b) Includes fuel and electricity used for metallurgical purposes.

(c) Statistics for Prince Edward Island included with Nova Scotia in 1936.

DOMINION BUREAU OF STATISTICS

Table 22.—Summary, by Nine Main Branches, of the Net Value of Production in Canada, 1934-1936 (a)

	1934 (x)	1935 (x)	1936 (x)	Percentage of total net value, 1936
	\$	\$	\$	%
Agriculture.....	592,195,000	617,867,000	690,379,000	25.90
Forestry.....	208,207,484	198,545,244	231,937,561	8.70
Fisheries.....	34,022,323	30,269,056	34,234,063	1.28
Trapping.....	8,636,885	8,877,331	9,214,325	0.35
Mining (Total).....	209,073,789	238,581,268	291,972,359	10.95
Auriferous quartz.....	(64,812,875)	(75,120,774)	(88,210,233)	(3.31)
Other mining.....	(144,260,914)	(163,460,494)	(203,762,126)	(7.64)
Electric power.....	122,461,993	125,123,078	133,561,387	5.01
Construction.....	115,406,755	120,815,289	135,851,162	5.10
Custom and repair.....	62,444,353	91,711,442	97,333,712	3.65
Manufactures, n.e.s.....	881,248,436	937,274,675	1,041,378,120	39.06
Grand Total (†).....	2,233,697,018	2,369,064,383	(a) 2,665,861,689	100
Manufactures, Total (†).....	1,222,943,899	1,150,899,283	1,289,592,672	48.37

(a) General Statistics Branch, Dominion Bureau of Statistics.

(x) Figures since 1934 have been revised in accordance with Resolution 23 of the conference of British Commonwealth Statisticians, 1935, whereby the cost of fuels and purchased electricity, in addition to cost of materials or process supplies, was deducted from the gross value.

(†) The difference between "manufactures, total" and "manufactures, n.e.s." is the amount of the duplication between primary and secondary industries. The sum of "manufactures, n.e.s." and the eight other main branches is regarded as the grand total.

Table 23.—Employees, Salaries and Wages in the Mineral Industry in Canada, by Provinces, 1936

Industry and year	*Average number of employees				Salaries and wages		
	Salaried employees		Wage earners	Total†	Salaries	Wages	Total
	Male	Female					
Nova Scotia (a).....	589	59	14,720	15,368	1,019,532	14,961,155	15,980,687
New Brunswick.....	70	15	1,659	1,744	152,670	1,095,761	1,248,431
Quebec.....	1,278	126	12,821	14,225	2,260,386	13,513,976	15,774,362
Ontario.....	2,436	367	28,302	31,105	5,780,947	41,118,858	46,899,805
Manitoba.....	282	12	2,638	2,932	589,023	3,163,344	3,752,367
Saskatchewan.....	151	10	1,667	1,828	307,784	1,630,041	1,937,825
Alberta.....	784	105	9,487	10,376	1,670,369	10,180,094	11,850,463
British Columbia.....	1,156	105	11,566	12,827	2,682,126	15,226,427	17,908,553
Yukon.....	50	5	511	566	149,476	1,223,441	1,372,917
N.W.T.....	4	.....	24	28	10,150	30,662	40,812
Canada.....	6,800	804	83,395	90,999	14,622,463	102,143,759	116,766,222

*The average number of wage-earners was obtained by adding the monthly figures for individual companies and dividing by 12 irrespective of the number of months worked, the average number of wage-earners in the industry, as in the previous year, is the sum of these individual averages.

†The data are not inclusive of all individuals or syndicates engaged exclusively in prospecting or general exploration.

(a) Includes statistics for Prince Edward Island.

Table 24.—Employees, Salaries and Wages in the Mineral Industry in Canada, by Industries, 1936

Industry	*Average number of employees				Salaries and wages		
	Salaried employees		Wage- earners	Total	Salaries	Wages	Total
	Male	Female					
METAL MINING					\$	\$	\$
Alluvial Gold Mines.....	75	4	774	853	184,553	1,335,106	1,519,659
Auriferous Quartz Mines.....	2,275	160	22,662	25,097	4,777,388	35,049,354	39,826,742
Copper-Gold-Silver Mines.....	311	15	3,412	3,738	745,467	4,727,858	5,473,325
Silver-Cobalt Mines.....	37	1	325	363	67,268	391,278	458,546
Silver-Lead-Zinc Mines†.....	240	15	1,615	1,870	525,131	2,392,701	2,917,832
Nickel-Copper Mines.....	89	3	4,314	4,406	237,287	7,094,255	7,331,542
Miscellaneous Metal Mines.....	12	1	100	113	11,110	131,864	142,974
Non-ferrous Smelting and Refining.	752	111	9,152	10,015	2,176,110	12,169,940	14,346,050
NON-METAL MINING, INCLUDING FUELS							
<i>Fuels</i>							
Coal.....	1,207	114	25,597	26,918	2,541,453	26,331,682	28,873,135
Natural Gas.....	623	174	1,278	2,075	1,137,506	1,319,412	2,456,918
Petroleum.....	132	33	887	1,052	263,313	1,035,279	1,298,592
<i>Other Non-Metal Mining</i>							
Abrasives—natural.....	5	.....	25	30	6,530	10,912	17,442
Asbestos.....	163	32	2,452	2,647	330,565	2,312,359	2,642,924
Feldspar and Quartz (a).....	26	5	293	324	46,098	192,750	238,848
Gypsum.....	58	6	450	514	88,786	351,511	440,297
Iron Oxides.....	2	1	36	39	3,792	26,489	30,281
Mica.....	2	1	98	101	3,565	40,985	44,550
Salt.....	82	40	384	506	225,170	415,474	640,644
Talc and Soapstone.....	13	2	70	85	26,526	44,409	70,935
Miscellaneous.....	62	14	401	477	106,761	419,487	526,248
CLAY PRODUCTS AND OTHER STRUCTURAL MATERIALS							
Cement.....	79	5	968	1,052	173,001	1,023,663	1,196,664
Clay Products.....	202	27	1,546	1,775	390,737	1,107,411	1,498,148
Lime.....	64	9	726	799	90,288	550,034	640,322
Sand and Gravel.....	59	7	3,572	3,638	103,587	1,986,801	2,090,388
Stone.....	230	24	2,258	2,512	360,471	1,682,745	2,043,216
Total.....	6,800	804	83,395	90,999	14,622,463	102,143,759	116,766,222

*See Footnote preceding table.

†Includes pitchblende-silver mines.

(a) Includes nepheline-syenite mines.

Table 25.—Number of Wage-Earners in Canadian Mining Industry, in Month of Highest Employment during 1936 whose Regular (Normal) Hours, per Week, were:

(Does not include overtime)

	40 hours or less	41-43 hours	44 hours	45-47 hours	48 hours	49-50 hours	51-53 hours	54 hours	55 hours	56-59 hours	60 hours	Over 60 hours
By Provinces—												
Nova Scotia (x).....	2,459	11	6	20	12,231	100	44	332	45	370	1,334	189
New Brunswick.....	2	58	8	1,538	28	2	251	180	1,807	3,194	1,274	28
Quebec.....	639	80	715	206	6,330	1,057	212	2,249	180	1,807	3,194	1,274
Ontario.....	446	37	425	1,240	21,315	458	412	2,140	316	4,170	1,128	2,340
Manitoba.....	72	4	116	4	4,897	9	51	34	66	486	1,103	135
Saskatchewan.....	463	35	9	40	967	41	14	188	56	229	348	101
Alberta.....	1,402	82	416	396	8,704	83	24	297	45	479	194	33
British Columbia.....	3,163	60	243	121	7,904	104	665	3	90	1,331	5	22
Yukon.....					4		58			235	9	456
N.W.T.....											16	
Canada.....	8,646	309	1,988	2,035	63,890	1,880	1,482	5,494	778	9,111	6,420	4,578
By Industries—												
METAL MINING—												
Alluvial Gold Mines.....					470			2	21	270	30	469
Auriferous Quartz Mines.....	220	35	73	355	16,376	301	1,223	2,270	85	5,311	520	2,718
Copper-Gold-Silver Mines.....	3	44	32	16	3,050			264	4	241	4	77
Silver-Cobalt Mines.....	8	3		5	279	1	19	80		22	5	22
†Silver-Lead-Zinc Mines.....	23			2	1,217		59	5	40	448	9	87
Nickel-Copper Mines.....	6	1	1	203	4,220	3	3	126	3	230	8	29
Miscellaneous Metal Mines.....	7				66			57			20	1
Non-Ferrous Smelting and Refining.....	2,954		469	713	4,997	1	5	185		498	37	27
NON-METAL MINING, INCLUDING FUELS—												
Fuels—												
Coal.....	3,846	114	183	259	24,074	89	38	407	72	319	451	18
Natural gas.....	134	7	205	81	592	218	2	703	17	7	219	96
Petroleum.....	347	4	4	155	264	30		42	10	349	78	22
Other Non-Metal Mining—												
Abrasives—natural.....					15						18	
Asbestos.....	8		127		1,378	802		13		453	242	6
Feldspar and Quartz.....	4	12		19	105	26	7	51	4	1	130	88
Gypsum.....	154	9	46	20	356	10	14	7	30	55	201	
Iron Oxides.....	10	1				1	20	6		1	20	6
Mica.....			26		21			57			11	
Salt.....	16	3	8		210	10	4	30	7	43	45	83
Talc and Soapstone.....	1						2	49			29	
Miscellaneous.....	59	8	3	5	61	13	12	26	36	210	51	138
CLAY PRODUCTS AND OTHER STRUCTURAL MATERIALS—												
Cement.....	60		262	25	440	1	14	58	17	128	105	37
Clay Products.....	217	15	336	92	445	230	33	404	140	218	534	143
Lime.....	16	21	49	2	350	30		51	41	105	126	65
Sand and Gravel.....	25		21		3,617	11		58	5	43	2,866	17
Stone.....	528	32	143	83	1,297	103	27	543	246	159	661	429
Total.....	8,646	309	1,988	2,035	63,890	1,880	1,482	5,494	778	9,111	6,420	4,578

† Contains data on mining of silver-pitchblende ores in the Northwest Territories.

(x) Statistics for Prince Edward Island included with Nova Scotia.

Table 26.—Revised Estimates of British and Foreign Capital Invested in the Canadian Mining Industry and Grand Total of all British and Foreign Capital Invested in Canada, 1927-1937

(Internal Trade Branch)

(In millions of dollars)

Year	British	United States	Other Countries	Total British and Foreign Capital	Total All Capital
1927.....	99.0	197.0	3.0	299.0	6,184.3
1928.....	117.0	234.0	4.0	355.0	6,498.9
1929.....	120.0	239.0	4.0	363.0	6,835.7
1930.....	98.0	270.0	8.0	376.0	7,195.9
1931.....	93.0	254.0	8.0	355.0	7,067.8
1932.....	87.0	239.0	7.0	333.0	6,954.2
1933.....	87.0	241.0	7.0	335.0	6,913.9
1934.....	91.0	252.0	7.0	350.0	6,965.1
1935.....	85.0	234.0	7.0	326.0	6,897.5
1936.....	89.0	244.0	7.0	340.0	6,833.7
1937 (1).....	93.0	260.0	10.0	363.0	6,848.0

(1) Subject to revision.

Table 27.—Index Numbers (Averages) of Employment by Industries (1926=100).

(General Statistics Branch)

NOTE.—The relative weight shows the proportion of employees reported in the indicated industry to the total number of employees reported in Canada by the firms reporting for Dec. 1, 1936.

—	Manu- facturing	Logging	All Mining	Metal Mining	Communi- cations	Trans- portation	Con- struction	Service	Trade	All Industries
1921.....	87.7	103.0	98.0	56.1	90.2	94.1	71.1	83.6	92.7	88.8
1926.....	99.6	99.5	99.7	99.4	99.6	99.7	99.2	99.5	99.2	99.6
1928.....	110.1	114.5	114.4	127.0	108.2	105.9	118.8	118.1	116.1	111.6
1930.....	109.0	108.0	117.8	145.6	119.8	104.6	129.8	131.6	127.7	113.4
1931.....	95.3	60.1	107.7	138.7	104.7	95.8	131.4	124.7	123.6	102.5
1932.....	84.4	42.6	99.2	133.1	93.5	84.7	86.0	113.6	116.1	87.5
1933.....	80.9	66.5	97.5	143.8	83.9	79.0	74.6	106.7	112.1	83.4
1934.....	90.2	124.7	110.8	179.4	79.1	80.3	109.3	115.1	117.9	96.9
1935.....	97.1	126.9	123.3	218.8	79.8	81.2	97.8	118.2	122.1	99.4
1936										
Jan. 1.....	96.8	183.4	129.9	226.6	79.3	77.9	74.8	118.0	135.9	99.1
Feb. 1.....	98.5	173.1	129.4	228.7	77.2	78.2	74.4	116.4	121.6	98.4
Mar. 1.....	99.5	147.0	129.1	234.9	77.7	78.9	78.2	117.5	123.1	98.9
April 1.....	101.1	102.6	128.2	237.5	77.7	78.5	71.8	118.5	121.0	97.4
May 1.....	102.7	88.6	127.4	243.9	78.4	82.8	79.4	120.4	123.3	99.5
June 1.....	103.4	94.1	132.1	252.6	80.0	85.4	87.0	123.0	127.1	102.0
July 1.....	104.7	93.4	134.1	258.0	82.4	87.1	97.4	131.7	127.3	104.6
Aug. 1.....	104.9	85.0	137.9	265.6	84.1	88.7	102.9	135.8	126.3	105.6
Sept. 1.....	105.9	82.7	140.2	272.7	86.0	89.4	109.0	137.5	126.3	107.1
Oct. 1.....	109.0	141.7	147.9	281.3	84.6	88.3	103.9	127.4	129.6	110.1
Nov. 1.....	107.7	206.9	151.8	286.7	83.1	87.1	99.6	124.9	132.0	111.0
Dec. 1.....	107.0	265.7	150.3	283.7	81.7	86.5	80.1	122.4	136.0	110.1
1936 average.....	103.4	138.7	136.5	256.0	81.0	84.1	88.2	124.5	127.5	103.7
Relative weight of employment by industries as at Dec. 1, 1936.....	51.9	7.2	6.6	3.3 (x)	2.1	9.9	9.1	2.6	10.6	100.0

¹ The average for the calendar year 1926, including figures up to Dec. 31, 1926, being the base used in computing these indexes, the average index here given for the 12 months Jan. 1-Dec. 1, 1926, generally shows a slight variation from 100.

(x) Based on 34,655 employees and 218 mines.

Table 28.—Fuel and Electricity Used for Heat and Power

Industry	Bituminous coal		Anthracite coal		Lignite coal	Coke	Gasoline
	Canadian	Imported	From United States	Other			
METAL MINING	Tons	Tons	Tons	Tons	Tons	Tons	Imp. gal.
Alluvial Gold Mines..... Quantity	3	3	37	.....	.....	12	26,617
\$	632	180	2,254	.....	.....	1,230	12,742
Auriferous Quartz Mines..... Quantity	10,143	23,447	1,627	496	43	237	444,282
\$	93,737	227,883	22,880	7,495	543	3,831	141,537
Copper-Gold-Silver Mines..... Quantity	3,297	220	135	.....	.....	78	28,160
\$	30,429	2,733	3,010	.....	.....	1,405	8,120
Silver-Cobalt Mines..... Quantity	67	871	64	261	.....	.....	1,809
\$	768	11,564	900	3,609	.....	.....	497
Silver-Lead-Zinc Mines..... Quantity	32,000	.....	1	.....	180	.....	75,769
\$	137,844	.....	18	.....	1,143	.....	42,733
Nickel-Copper Mines..... Quantity	3,521	286	1	80	.....	.....	18,703
\$	19,656	2,153	25	1,124	.....	.....	3,636
Miscellaneous Metal Mines..... Quantity	5	5	.....	.....	.....	.....	1,050
\$	38	262	.....	.....	.....	.....	366
Non-Ferrous Smelting and Re- Quantity	12,256	27,320	3	49	.....	1,142	82,557
fining. (See footnote) \$	61,194	161,631	49	688	.....	12,616	16,274
Total..... Quantity	61,292	52,152	1,868	886	223	1,469	678,947
\$	344,298	406,406	29,136	12,916	1,686	19,082	225,905
NON-METAL MINING, INCLUDING FUELS							
Fuels							
Coal..... Quantity	642,749	.....	.....	.....	74,687	.....	55,007
\$	1,977,685	.....	.....	.....	72,772	.....	14,070
Natural Gas..... Quantity	98	146	.....	.....	.....	2	48,770
\$	883	1,167	.....	.....	.....	24	11,283
Petroleum..... Quantity	3,115	.....	.....	.....	739	.....	9,403
\$	16,164	.....	.....	.....	1,871	.....	2,128
Total..... Quantity	645,962	146	.....	.....	76,426	2	113,180
\$	1,994,732	1,167	.....	.....	74,643	24	27,481
Other Non-Metal Mining							
Abrasives—natural..... Quantity	113	.....	.....	.....	.....	.....	.....
\$	804	.....	.....	.....	.....	.....	.....
Asbestos..... Quantity	21,391	.....	12,992	2,827	.....	56	54,492
\$	151,741	.....	96,346	17,729	.....	672	12,356
Feldspar and Quartz..... Quantity	956	2,758	20	13	.....	4	19,508
\$	6,288	17,704	260	213	.....	77	4,546
Gypsum..... Quantity	5,125	843	.....	.....	305	207	100,894
\$	29,124	5,551	.....	.....	1,650	1,940	24,934
Iron Oxides..... Quantity	.....	150	.....	13	.....	.....	100
\$	.....	1,072	.....	202	.....	.....	30
Mica..... Quantity	.....	.....	5	.....	.....	.....	2,081
\$	.....	.....	90	.....	.....	.....	519
Salt..... Quantity	2,600	24,709	.....	3,670	4,885	.....	3,560
\$	13,000	113,117	.....	16,253	16,545	.....	596
Talc and Soapstone..... Quantity	192	.....	.....	34	.....	.....	1,600
\$	1,217	.....	.....	221	.....	.....	304
Miscellaneous..... Quantity	14,851	1,385	2	12	26,045	2	60,076
\$	90,701	6,654	30	180	63,412	31	13,456
Total..... Quantity	45,228	29,845	13,019	6,569	31,255	269	243,311
\$	292,875	144,098	96,726	34,798	81,607	2,720	56,541
STRUCTURAL MATERIALS AND CLAY PRODUCTS							
Cement..... Quantity	119,903	66,460	.....	.....	.....	.....	94,015
\$	635,631	367,740	.....	.....	.....	.....	17,564
Clay Products..... Quantity	20,726	52,936	600	186	520	337	25,203
\$	119,396	348,565	4,124	1,016	1,992	3,025	5,463
Lime..... Quantity	32,960	53,904	120	.....	85	11,532	29,088
\$	178,648	282,908	708	.....	316	81,857	6,441
Sand and Gravel..... Quantity	636	1,168	.....	.....	.....	.....	54,616
\$	4,219	8,315	.....	.....	.....	.....	11,879
Stone..... Quantity	4,333	6,479	1,790	97	.....	22	239,804
\$	31,677	44,293	12,547	1,030	.....	.....	49,578
Total..... Quantity	178,558	180,947	2,510	283	605	11,871	442,726
\$	969,571	1,051,821	17,379	2,046	2,308	84,904	90,925
Grand Total..... Quantity	931,040	263,090	17,397	7,738	107,489	13,611	1,477,164
\$	3,601,476	1,603,492	143,241	49,760	160,244	106,730	400,852

† Explosives, chemicals, etc.

in the Mineral Industry in Canada, by Kinds and Industries, 1936

Kero- sene	Fuel oil and diesel oil	Wood	Gas		Other fuel	Electricity purchased	Total	Electricity generated for own use	Electri- city generated for sale	Process supplies †
			Manu- factured	Natural						
Imp. gal.	Imp. gal.	Cords	M cu. ft.	M cu. ft.	\$	K.W.H.	\$	K.W.H.	K.W.H.	\$
4,374	152,811	7,448						19,832,558		
1,705	29,683	61,766					110,192			56,382
54,778	4,747,728	119,096	218			449,028,003	6,076,365	34,004,319	712,546	13,806,419
12,984	687,864	522,249	256		10,040	4,345,066		24,027,024	8,128	
4,322	538,315	1,205				73,388,066	495,843			3,156,225
1,041	39,932	7,091				402,074				77,220
	12,630	1,299				5,181,196	104,372			
	1,641	5,801			20,507	59,085		16,833,561		
91,490	760,607	3,601				48,035,665				1,213,818
12,278	210,192	30,721				245,748	680,677			3,802,763
2,135	174,221	3,406				82,341,404	300,044			21,451
4,439	17,363	10,945				244,700		5,223		
201	4,162	3,177				354,631				
49	916	9	653	370		1,240,494,288	3,856,490	29,851,136		7,989,580
2,871	76,060	28	1,325	260	882	3,595,564				
645	5,334	435								
160,171	6,466,534	137,435	871	370		1,898,821,253		124,553,821	712,546	
29,141	992,925	642,329	1,551	260	31,429	8,895,783	11,632,877		8,128	30,123,858
2,593	1,718					111,898,797		46,079,613	10,260,702	
687	301					1,441,477	3,506,992		166,421	4,581,162
	780	50		147,242		14,032				
	103	201		63,731		266	77,658			1,376
180	658,756	350		2,605,003		2,045,208				
26	35,599	1,274		149,276		28,872	235,210			274,806
2,773	661,254	400		2,752,245		113,958,037		46,079,613	10,260,702	
713	36,003	1,476		213,007		1,470,616	3,819,860		166,421	4,857,344
	25,000							40,000		224
	2,500						3,304			
6,087	12,106	65				87,310,604				
867	1,350	65				698,067	979,193			1,420,282
865	186,617	508				738,450		1,056,100		
168	13,304	1,655				12,929	56,944			103,969
739	106,635	1,454		21,311		4,141,065		1,000,326		
158	7,203	5,861		8,530		55,727	140,678			78,191
85		1,616				140,000				
21		6,851				2,733	10,909			510
		86				45,000		189,500		
		239			3	500	1,351			3,473
476	147,704	50				593,030		3,970,673		
102	13,874	150				7,865	181,502			31,195
20	1,560	10				1,249,914				
4	179	30				19,714	21,669			11,723
954	1,701,478	1,143		37,989		3,242,068		2,108,997		
186	91,170	2,541		3,742	14	23,900	296,017			252,417
9,226	2,181,100	4,932		59,300		97,460,131		8,365,596		
1,506	129,580	17,392		12,272	17	821,435	1,691,567			1,901,984
2,931	13,589					62,038,700				
517	1,478					553,212	1,576,142			592,929
856	15,567	21,363		763,315		7,765,144		169,399		
169	1,808	76,263		26,457	665	106,058	695,001			71,353
211	468,402	40,341				8,410,745		531,242		
54	21,420	120,072				51,239	743,663			96,316
210	27,799	12	6,846	51		3,046,681				
44	2,950	56	2,738	31		42,582	72,836			28,223
3,521	134,180	5,245				17,467,894				
446	16,492	13,424				227,478	396,965			444,739
7,729	659,537	66,961	6,846	763,366		98,729,164		700,641		
1,230	44,148	209,815	2,738	26,488	665	980,569	3,484,607			1,233,560
179,899	9,968,425	209,728	7,717	3,575,281		2,208,968,585		179,699,671	10,973,248	
32,590	1,202,656	871,011	4,319	252,027	32,111	12,168,402	20,628,911		174,549	38,116,746

DOMINION BUREAU OF STATISTICS

Table 29.—Fuel and Electricity Used for Heat and Power

Province	Bituminous coal		Anthracite coal		Lignite coal	Coke	Gasolene
	Canadian	Imported	From United States	From other Countries			
	Tons	Tons	Tons	Tons	Tons	Tons	Imp. gal.
Nova Scotia.....Quantity	430,528					3,509	140,864
\$	1,455,347					18,645	35,005
New Brunswick.....Quantity	9,472	8					23,853
\$	40,997	128					5,411
Quebec.....Quantity	153,271	16,508	15,363	3,273		206	436,671
\$	866,274	121,135	119,517	22,142		2,194	104,908
Ontario.....Quantity	13,562	245,720	1,870	4,429		9,684	534,261
\$	102,611	1,472,659	18,049	27,276		82,105	121,611
Manitoba.....Quantity	15,333	818			5,448	26	108,240
\$	120,595	8,255			18,939	418	42,986
Saskatchewan.....Quantity	3,846				57,566	13	37,407
\$	27,345				98,716	206	9,797
Alberta.....Quantity	127,223				44,250		30,819
\$	358,621				40,881		8,320
British Columbia.....Quantity	177,780	36	127	36	225	161	109,937
\$	597,954	1,315	3,421	342	1,708	1,932	37,480
Yukon.....Quantity	25		37			12	54,667
\$	1,732		2,254			1,230	34,976
N.W.T.....Quantity							445
\$							358
Canada.....Quantity	931,040	263,090	17,397	7,738	107,489	13,611	1,477,164
\$	3,601,476	1,603,492	143,241	49,760	160,244	106,730	400,852

* In addition fuel and electricity were used for metallurgical purposes—see following table.

Table 30.—Fuel and Electricity Used for Metallurgical Purposes in

Province	Bituminous coal		Anthracite coal		Lignite coal	Coke
	Canadian	Imported	From United States	From other Countries		
	Tons	Tons	Tons	Tons	Tons	Tons
Quebec.....Quantity	104,190	12				1,356
\$	806,119	85				12,871
Ontario.....Quantity	233,479	78,577				207,582
\$	1,331,448	452,620				2,078,299
Manitoba.....Quantity	24,522					
\$	197,966					
Saskatchewan.....Quantity	12,078					
\$	97,506					
British Columbia.....Quantity	85,044					70,514
\$	410,331					636,366
Canada.....Quantity	459,313	78,589				279,452
\$	2,843,370	452,705				2,727,536

* All used in the non-ferrous smelting and refining industry.

in the Mineral Industry in Canada, by Provinces, 1936

Kerosene	Fuel oil and diesel oil	Wood	Gas		Other fuel	Electricity purchased	Total	Electricity generated for own use	Electricity generated for sale	Process supplies
			Manu- factured	Natural						
Imp. gal.	Imp. gal.	Cords	M cu. ft.	M cu. ft.	\$	K.W.H.	\$	K.W.H.	K.W.H.	\$
2,483 485	614,263 62,996	4,029 14,888	218 256	37,989 3,742	.....	81,355,438 1,076,043	.....	23,337,964	7,226,531 74,863	..... 2,948,029
.....	.....	11,205 35,492	.....	29,561 14,111	.....	1,427,612 29,470	.....	569,424	.....	..... 116,505
39,609 6,900	1,407,374 194,810	63,475 234,765	.....	.....	5,613	311,433,298 2,401,357	.....	25,367,124	.....	..... 7,189,118
31,717 8,459	1,902,360 305,837	87,105 354,502	7,499 4,063	140,635 60,508	25,965	741,939,012 4,667,435	.....	21,976,607	.....	..... 19,097,761
1,883 492	213,589 44,501	13,273 65,656	.....	.....	.....	54,244,247 205,755	.....	10,325,785	375,160 1,390	..... 1,427,094
1,138 245	1,758,227 103,140	1,997 9,615	.....	.....	.....	17,903,854 52,484	.....	2,664,788	.....	..... 583,788
2,370 652	656,406 35,042	810 3,164	.....	3,365,996 173,421	.....	28,668,753 364,948	.....	12,538,941	730,080 51,974	..... 1,371,956
98,671 13,987	3,102,242 278,144	22,705 87,795	.....	.....	533	971,996,371 3,370,910	.....	63,896,036	2,641,477 46,322	..... 5,031,154
2,028 1,370	303,565 174,249	4,879 63,634	.....	.....	.....	.....	.....	19,022,202	.....	..... 345,241
.....	10,399 3,937	250 1,500	.....	1,100 245	.....	.....	.....	800	.....	..... 6,100
179,899 32,590	9,968,425 1,202,656	209,728 871,011	7,717 4,319	3,575,281 252,027	32,111	2,208,968,585 12,168,402	.....	179,699,671	10,973,248 174,549	..... 38,116,746

the Mineral Industry of Canada, by Provinces, 1936

Gasolene	Kerosene	Fuel oil and diesel oil	Wood	Gas		Other fuel	Electricity purchased	Total	Electricity generated for own use
				Manu- factured	Natural				
Imp. gal.	Imp. gal.	Imp. gal.	Cords	M cu. ft.	M cu. ft.	\$	K.W.H.	\$	K.W.H.
.....	.....	2,433,938 116,299	1,000 3,864	28,463 2,909	.....	.....	720,399,742 1,347,780	.....	55,123,271
2,358 680	4,371 870	11,251,865 545,040	6,631 56,565	.....	.....	7,882	148,360,123 506,775	.....	4,980,179
.....	.....	44 310	.....	.....	.....	.....	49,220,926 22,081	.....	220,357
.....	.....	22 152	.....	.....	.....	.....	24,243,143 10,877	.....	108,535
.....	.....	912,041 105,364	1,067 6,214	.....	.....	.....	.....	.....	1,158,275
2,358 680	4,371 870	14,597,844 766,703	8,764 67,105	28,463 2,909	.....	7,882	942,223,934 1,887,513	.....	55,123,271

Table 31.—Power Equipment in Use, and Power Equipment in
ORDINARILY IN USE

Province	Steam engines and turbines	Diesel engines	Gasolene, gas and oil engines other than diesel engines	Hydraulic turbines or water wheels	Total primary power	Electric motors run by purchased power	Total power employed	Electric motors run by primary power in same plant	Boilers
Nova Scotia.....No. H.P.	88 52,375	29 3,463	96 3,570	3 85	216 59,493	700 50,530	916 110,023	280 12,708	131 33,950
New Brunswick.....No. H.P.	25 1,633	..... .....	39 1,145	1 75	65 2,853	140 1,485	205 4,338	10 242	25 1,327
Quebec.....No. H.P.	75 6,316	39 6,593	169 5,257	13 51,670	296 69,836	4,075 149,297	4,371 219,133	336 4,376	123 14,559
Ontario.....No. H.P.	194 13,052	61 10,139	400 13,635	89 3,549	744 40,375	7,387 315,632	8,131 356,007	870 14,948	258 29,283
Manitoba.....No. H.P.	22 641	11 1,309	39 1,262	1 1,900	73 5,112	1,230 51,367	1,303 56,479	66 2,485	32 3,270
Saskatchewan.....No. H.P.	43 2,692	8 1,015	30 610	..... .....	81 4,317	529 16,115	610 20,432	195 2,528	20 3,507
Alberta.....No. H.P.	181 26,136	..... .....	91 2,163	..... .....	272 28,299	1,115 34,300	1,387 62,599	379 10,267	241 31,319
British Columbia.....No. H.P.	105 21,926	79 9,639	98 2,586	57 31,252	339 65,403	3,445 165,041	3,784 230,444	764 29,153	111 19,910
Yukon.....No. H.P.	10 260	15 1,600	6 100	2 10,000	33 11,960	..... .....	33 11,960	202 10,715	7 232
N.W.T.....No. H.P.	..... .....	3 209	1 5	..... .....	4 214	..... .....	4 214	2 40	5 145
Canada.....No. H.P.	743 125,031	245 33,967	969 30,333	166 98,531	2,123 287,862	18,621 783,767	20,744 1,071,629	3,104 87,462	953 137,592

Table 32.—Power Equipment in Use, and Power Equipment in
ORDINARILY IN USE

Province	Steam engines and turbines	Diesel engines	Gasolene, gas and oil engines other than diesel engines	Hydraulic turbines or water wheels	Total primary power	Electric motors run by purchased power	Total power employed	Electric motors run by primary power in same plant	Boilers
METAL MINING—									
Alluvial Gold									
Mines.....No. H.P.	15 426	12 1,343	35 520	9 10,413	71 12,702	..... .....	71 12,702	174 11,675	8 314
Auriferous Quartz									
Mines.....No. H.P.	91 4,570	148 22,051	211 7,125	64 11,322	514 45,068	5,006 159,729	5,520 204,797	864 17,870	226 17,697
Copper-Gold-Silver									
Mines.....No. H.P.	4 96	..... .....	6 240	7 9,300	17 9,636	1,417 60,119	1,434 69,755	80 4,263	6 448
Silver-Cobalt									
Mines.....No. H.P.	..... .....	..... .....	1 65	..... .....	1 65	51 1,874	52 1,939	..... .....	5 300
Silver-Lead-Zinc									
Mines.....No. H.P.	3 6,000	32 3,626	17 639	7 1,030	59 11,295	645 20,396	704 31,691	265 3,524	17 2,989
Nickel-Copper									
Mines.....No. H.P.	3 120	..... .....	..... .....	2 720	5 840	453 34,913	458 35,753	..... .....	5 482
Miscellaneous Metal									
Mines.....No. H.P.	5 114	3 147	4 8	..... .....	12 269	14 165	26 434	..... .....	2 140
Non-ferrous Smelting and Refining.....No. H.P.	24 7,691	1 156	11 457	11 51,125	47 59,429	5,101 254,009	5,148 313,438	575 7,922	51 25,159
Total.....No. H.P.	145 19,017	196 27,323	285 9,054	100 83,910	726 139,304	12,687 531,205	13,413 670,509	1,958 45,254	320 47,529

Reserve or Idle, in the Mineral Industry in Canada, by Provinces, 1936

IN RESERVE OR IDLE

Steam engines and turbines	Diesel engines	Gasolene, gas and oil engines other than diesel engines	Hydraulic turbines or water wheels	Total primary power	Electric motors run by purchased power	Total power employed	Electric motors run by primary power in same plant	Boilers
15	3	12	1	31	13	44	14	17
4,220	185	479	50	4,934	761	5,695	952	2,333
6				6	6	12		2
204				204	278	482		39
15	9	49	1	74	290	364	28	31
617	890	1,696	75	3,278	14,157	17,435	430	3,362
43	7	53	6	109	588	697	47	49
5,869	675	2,281	153	8,978	32,128	41,106	752	4,399
14		25		39	184	223	4	12
2,646		1,674		4,320	4,383	8,703	58	1,190
6	2	10		18	12	30	4	2
1,596	261	597		2,454	373	2,827	94	330
32	5	5		42	4	46	2	8
6,328	45	95		6,468	85	6,553	65	945
10	29	10	18	67	466	533	73	29
2,791	2,812	252	2,245	8,100	11,949	20,049	1,086	2,908
2	2	6	1	11		11		1
24	360	126	5,000	5,510		5,510		150
143	57	170	27	397	1,563	1,960	172	151
24,295	5,228	7,200	7,523	44,246	64,114	108,360	3,437	15,656

Reserve or Idle, in the Mineral Industry in Canada, by Industries, 1936

IN RESERVE OR IDLE

Steam engines and turbines	Diesel engines	Gasolene, gas and oil engines other than diesel engines	Hydraulic turbines or water wheels	Total primary power	Electric motors run by purchased power	Total power employed	Electric motors run by primary power in same plant	Boilers
4	3	3	1	11		11		3
55	318	63	5,000	5,436		5,436		119
31	29	74	15	149	349	498	35	53
1,647	2,721	3,661	1,968	9,997	12,474	22,471	519	3,644
1		2		3	169	172		1
10		185		195	5,317	5,512		75
3				3	1	4		2
235				235	100	335		100
	10	5	1	16	99	115	71	2
	1,504	69	60	1,633	3,770	5,403	836	192
					61	61		
					4,329	4,329		
	3			3	3	6		1
	235			235	85	320		15
12		24		36	584	620	42	11
6,919		1,740		8,659	26,941	35,600	534	3,232
51	45	108	17	221	1,266	1,487	148	73
8,866	4,778	5,718	7,028	26,390	53,016	79,406	1,889	7,377

Table 32.—Power Equipment in Use, and Power Equipment in
ORDINARILY IN USE

Province	Steam engines and turbines	Diesel engines	Gasoline, gas and oil engines other than diesel engines	Hydraulic turbines or water wheels	Total primary power	Electric motors run by purchased power	Total power employed	Electric motors run by primary power in same plant	Boilers
Non-Metal Mining, INCLUDING FUELS—									
<i>Fuels</i>									
Coal.....No.	321		98	2	481	1,884	2,305	595	331
H.P.	87,015		1,536	12,000	100,551	81,468	182,019	33,021	60,503
Natural Gas.....No.	13		201		214	25	239	13	15
H.P.	425		5,979		6,404	674	7,078	202	570
Petroleum.....No.	36		58		94	102	196	36	83
H.P.	5,555		1,685		7,240	640	7,880	810	12,335
Total.....No.	370		357	2	729	2,011	2,740	644	429
H.P.	92,995		9,200	12,000	114,195	82,782	196,977	34,033	73,408
<i>Other Non-Metal Mining</i>									
Abrasives—natural..No.	1	1			2		2	14	1
H.P.	80	240			320		320	200	100
Asbestos.....No.	7		1		8	801	809		4
H.P.	235		6		241	44,449	44,690		115
Feldspar and Quartz(a).....No.	5	4	23		32	42	74	70	8
H.P.	445	790	905		2,140	893	3,033	504	675
Gypsum.....No.	10	3	51		64	184	248	39	8
H.P.	953	525	2,774		4,252	5,745	9,997	989	905
Iron oxides.....No.			1		1	6	7		1
H.P.			30		30	76	106		30
Mica.....No.			2	1	3	1	4	3	2
H.P.			46	145	191	15	206	115	140
Salt.....No.	33	3	1		37	39	76	152	8
H.P.	2,378	555	10		2,943	404	3,347	1,682	3,362
Talc and Soap-stone.....No.		1	4		5	20	25		
H.P.		25	30		55	598	653		
†Miscellaneous.....No.	5	4	18	2	29	97	126	126	7
H.P.	510	625	460	200	1,795	2,284	4,079	1,414	1,010
Total.....No.	61	16	101	3	181	1,190	1,371	404	39
H.P.	4,601	2,760	4,261	345	11,967	54,464	66,431	4,904	6,337
CLAY PRODUCTS AND OTHER STRUCTURAL MATERIALS—									
Cement.....No.	3	2	32		37	1,164	1,201	10	15
H.P.	113	516	1,405		2,034	69,203	71,237	756	587
Clay Products.....No.	51	4	35		90	476	566	17	61
H.P.	4,162	360	927		5,449	15,525	20,974	116	5,502
Lime.....No.	11	3	16	1	31	269	300	42	11
H.P.	500	329	445	20	1,294	5,559	6,853	539	868
Sand and Gravel.....No.	9	1	25	54	89	76	165		10
H.P.	342	135	957	1,531	2,965	2,591	5,556		452
Stone.....No.	93	23	118	6	240	748	988	29	68
H.P.	3,301	2,544	4,084	725	10,654	22,438	33,092	1,860	2,819
Total.....No.	167	33	226	61	487	2,733	3,220	98	165
H.P.	8,418	3,884	7,818	2,276	22,396	115,316	137,712	3,271	10,228
Grand total 1936.....No.	743	245	969	166	2,123	18,621	20,744	3,104	953
H.P.	125,031	33,967	30,333	98,531	287,862	783,767	1,071,629	87,462	137,502
Grand total 1935.....No.	764	182	845	112	1,903	16,471	18,374	3,298	956
H.P.	141,329	21,457	25,949	61,070	249,805	713,182	962,987	91,179	137,573

† Includes data for peat. (a) Includes nepheline-syenite.

Reserve or Idle, in the Mineral Industry in Canada, by Industries, 1936—Concluded

IN RESERVE OR IDLE

Steam engines and turbines	Diesel engines	Gasoline, gas and oil engines other than diesel engines	Hydraulic turbines or water wheels	Total primary power	Electric motors run by purchased power	Total power employed	Electric motors run by primary power in same plant	Boilers
42		6		48	26	74	5	20
11,702		137		11,839	649	12,488	855	4,195
2		5		7		7		1
85		65		150		150		45
2		2		4		10		6
96		22		118	36	154		595
46		13		59	32	91	5	27
11,883		224		12,107	685	12,792	855	4,835
		3		3	3	6		1
		10		10	55	65		18
		2		2	44	46		4
		10		10	3,205	3,215		300
3		1		4	1	5		1
38		60		98	15	113		25
6		6		12	60	72	2	4
338		316		654	2,107	2,761	85	240
				1		1		
		36		36		36		
1	2	3		6	1	7	5	6
25	45	19		89	40	129	100	650
2	1			3	9	12	2	
232	225			457	350	807	63	
12	3	16		31	118	149	9	16
633	270	451		1,354	5,772	7,126	248	1,233
		2		2		2		
		162		162		162		
10	5	8		23	59	82	1	13
1,220	45	142		1,407	1,970	3,377	110	1,205
		1		1	7	8		3
		3		3	230	233		128
7		7		14	21	35	1	2
446		250		696	585	1,281	20	38
17	4	15	10	46	60	106	8	17
1,247	135	250	495	2,127	1,856	3,983	315	840
34	9	33	10	86	147	233	10	35
2,913	180	807	495	4,395	4,641	9,036	445	2,211
143	57	170	27	397	1,563	1,960	172	151
24,295	5,225	7,200	7,523	44,246	64,114	108,360	3,437	15,656
175	55	169	22	421	1,254	1,675	184	182
21,142	5,432	8,224	16,925	51,723	52,239	103,962	4,063	17,249

DOMINION BUREAU OF STATISTICS

Table 33.—Mining Accidents in 1936

Cause of Accident	Nova Scotia		New Brunswick		Quebec		Ontario		Saskatchewan		Alberta		British Columbia		Canada	
	Fatal	Non-Fatal	Fatal	Non-Fatal	Fatal	Non-Fatal	Fatal	Non-Fatal	Fatal	Non-Fatal	Fatal	Non-Fatal	Fatal	Non-Fatal	Fatal	Non-Fatal
UNDERGROUND—																
Falls of roof or face.....	4	465	1	143	2	88	12	102	1	37	6	52	6	398	32	1,285
Mine cars and locomotives..	10	282	....	101	1	80	2	145	....	34	....	45	4	155	17	842
Gas and dust explosions.....	....	....	....	1	....	....	....	....	....	....	1	6	....	2	1	9
Explosives.....	....	3	....	20	3	12	7	26	....	1	....	3	4	9	14	74
Electricity.....	....	....	....	1	....	....	....	....	....	....	1	16	1	1	2	18
Miscellaneous.....	2	695	....	176	3	235	24	1,224	....	94	1	40	4	751	34	3,215
Total.....	16	1,445	1	442	9	415	45	1,497	1	166	9	162	19	1,316	100	5,443
SURFACE—																
Haulage.....	....	30	....	7	2	117	....	23	....	32	....	4	....	16	3	238
Machinery.....	....	23	....	7	....	95	3	73	....	14	....	2	2	24	6	238
Miscellaneous.....	1	200	....	33	8	288	2	623	....	49	....	12	1	382	16	1,708
Total.....	1	253	....	47	10	500	5	719	....	95	2	18	3	422	25	2,184
Grand Total....	17	1,698	1	489	19	915	50	2,216	1	261	11	180	22	1,738	125	7,627

CHAPTER TWO

THE GOLD MINING INDUSTRY IN CANADA

Including—(a) The Alluvial Gold Mining Industry; (b) The Auriferous Quartz Mining Industry; (c) The Copper-Gold-Silver Mining Industry; (d) Miscellaneous Data on Monetary Gold and World Gold Production and Prices.

Definition of the Industry.—Gold mining in Canada is classified into three principal industries—(a) the recovery of gold from the gravels and sands of stream channels or beaches or what is defined as “The Alluvial Gold Mining Industry”; (b) the recovery of lode gold, which is named “The Auriferous Quartz Mining Industry” and in which industry the gold is usually the most important economic constituent of the ores mined and quartz the predominant gangue mineral; (c) gold is often found in various other mineral deposits, more particularly in those of copper, and for this reason the review of Canada’s “Copper-Gold-Silver Mining Industry” is included here to complete a more comprehensive survey of the Canadian gold mining industry.

General Review

During 1936, production of new or primary gold from Canadian ores of all kinds totalled 3,748,028 fine ounces valued in Canadian currency at \$131,293,421 compared with 3,284,890 fine ounces worth \$115,595,279 in 1935. The output of the precious metal in 1936 represented a 14.1 per cent increase over that of the preceding year and established an all-time high record in Canadian gold mining.

Increases in output over 1935 were fairly well distributed throughout the gold-producing areas of the Dominion and largely reflected the bringing into production of new mines and the more intensive development and exploration of older properties.

Ontario accounted for 63.5 per cent of the Canadian gold output in 1936; Quebec, 17.8, and British Columbia, 12.1. Gold production in Nova Scotia, while yet relatively small compared with those of the major gold-producing provinces, is growing and an increase of 27.5 per cent during the year under review indicated more intensive mining development in this province where the metal was first discovered in 1860. Expansion in placer mining operations in the Yukon resulted in an increase in total gold production over 1935 of 14,452 ounces, while in the Great Slave Lake area of the Northwest Territories encouraging results in the exploration of several auriferous quartz deposits were reported. The combined gold output of Saskatchewan and Manitoba increased from 156,936 fine ounces in 1935 to 188,254 ounces in 1936, a considerable part of the production during both years originating in the copper-gold-silver ores of the Flin Flon mine, a large and highly developed sulphide deposit located on the interprovincial boundary.

The production of newly-mined Canadian gold, according to origin, has shown relatively little change during recent years; gold recovered as bullion at gold mines during 1936 comprised 77.37 per cent of the country’s total gold output; gold in blister copper produced comprised 13.80 per cent; placer gold, 2.27 per cent; and the remainder represented the metal contained chiefly in ores exported or silver-lead and other ores smelted in Canada.

The estimated average price per ounce of fine gold, expressed in Canadian currency, was \$35.03 in 1936, compared with a price of \$35.19 in 1935. Practically all of Canada’s newly-mined gold bullion is sold to the Dominion Government through the Royal Canadian Mint at Ottawa or the Assay Office at Vancouver. This gold is refined, converted into fine gold bars weighing approximately 400 ounces each, and is disposed of in world markets wherever the most advantageous net price can be obtained. During the recent past, New York has been generally the most advantageous market. After deducting charges for handling, melting, assaying and refining, the Government pays the gold producers the proceeds of the sale of the gold in the foreign market, converted into Canadian funds at the average rate of exchange prevailing during the week in which the gold is deposited with the Mint or assay office.

The most outstanding currency development of 1936 occurred when, on September 25, M. Vincent Auriol, the French Finance Minister, announced that the French Government had decided to devalue the franc. He stated that its new value would be between the limits of 49

and 43 milligrammes of gold, 0.900 fine (compared with the previous rate of 65.5 milligrammes) and that an exchange stabilization fund of 10,000 million francs would be set up. At the same time, M. Vincent Auriol revealed the terms of a monetary agreement reached by the French, British and United States governments. Devaluation was later followed by Switzerland, Latvia, Turkey, Holland and Italy.

In Canada an Act respecting Gold Clause obligations was passed by the House of Commons on April 8, 1937. The Act reads as follows:

1. This Act may be cited as The Gold Clauses Act, 1937.
2. The expression "gold clause obligation" in this Act means any obligation heretofore or hereafter incurred (including any such obligation which has, at the date of the commencement of this Act, matured) which purports to give to the creditor a right to require payment in gold or in gold coin or in an amount of money measured thereby, and includes any such obligation of the Government of Canada or of any province.
3. In the case of any gold clause obligation payable in money of Canada, tender of currency of Canada, dollar for dollar of the nominal or face amount of the obligation, shall be a legal tender and the debtor shall, on making payment in accordance with such a tender, be entitled to a discharge of the obligation.
4. In the case of any gold clause obligation governed by the law of Canada payable in Canada or elsewhere, in money other than money of Canada, tender of the nominal or face amount of the obligation in currency which is legal tender for the payment of debts in the country in the money of which the obligation is payable shall be a legal tender and the debtor shall, on making payment in accordance with such a tender, be entitled to a discharge of the obligation.
5. Any payment in respect of a gold clause obligation made before the commencement of this Act, which, if made hereafter, would entitle the debtor to a discharge, shall be deemed to have discharged the obligation.
6. Every gold clause obligation is hereby declared to be contrary to public policy and no such provision shall hereafter be contained in, or made in respect of, any obligation.
7. The provisions of this Act shall have full force and effect notwithstanding anything contained in any other statute or law.

Royal Canadian Mint.—The Ottawa Mint, established as a branch of the Royal Mint under the (Imperial) Coinage Act, 1870, and opened up on January 2, 1908, was by 21-22 Geo. V, C. 48, constituted a branch of the Department of Finance and since December 1, 1931, has operated as the Royal Canadian Mint. The great development of the gold mining industry in Canada has resulted in gold refining becoming one of the principal activities of the Mint. Gold coins have never been a popular medium of exchange in Canada and have not been struck since 1919, most of the fine gold produced from the rough shipments from the mines being delivered to the Department of Finance in the form of bars, the rest being sold in convenient form to manufacturers.

The domestic gold currency of Canada, as at present authorized by the Currency Act, consists of \$20, \$10, \$5 and \$2½ gold pieces, 900 millesimal fineness (only \$10 and \$5 pieces have been issued). Gold was used only to an insignificant extent as a circulating medium in Canada, its monetary use being practically confined to reserves; \$5 and \$10 gold pieces weighing respectively 129 and 258 grains, 9/10ths pure gold by weight, have been coined, the Canadian gold dollar thus containing 23.22 grains of pure gold. The \$5, \$10 and \$20 gold coins of the United States, which contain exactly the same weight of gold as Canadian gold coins of these denominations, are legal tender for their face value only, as are the British sovereigns, which are legal tender for \$4.86½, their equivalent in Canadian gold dollars.

The regulations in part for the receipt of gold bullion at the Royal Canadian Mint, Ottawa, are as follows: Each parcel of bullion for which a separate assay is required, shall be regarded as a separate deposit, and no ingot exceeding 1,500 ounces troy, gross weight, will be accepted. All deposits shall be dealt with in the order in which they are received. Deposits containing, by assay, less than 200 parts of gold in 1,000, or appearing, either before or after melting and assaying, to be unsuitable for treatment by the refining process in use, may be rejected. A deposit so rejected shall be returned to the depositor on payment by him of any costs incurred for melting and assaying.

The Mint charges, to be calculated on the gross weight of the deposit after melting, shall be as follows:—

(a) For melting and assaying—one dollar for the first four hundred ounces or part thereof and twenty-five cents for each additional one hundred ounces or part thereof.

(b) For refining—when the deposit contains not more than 5 per cent base metal, 3 cents the ounce.

Over 5 per cent but not over 10 per cent base metal, $3\frac{1}{2}$ cents the ounce.

Over 10 per cent but not over 15 per cent base metal, $4\frac{1}{4}$ cents the ounce.

Over 15 per cent but not over 20 per cent base metal, 5 cents the ounce.

On deposits which contain over 20 per cent base metal, or which require other treatment a charge not exceeding 10 cents the ounce, to be determined by the cost of treatment.

The minimum charge for refining shall be two dollars for each deposit and the charge for refining shall apply to all deposits containing, by assay, less than 995 parts fine gold in 1,000.

An additional handling charge at the rate of 35 cents the ounce fine, to cover costs of realization in a market outside Canada, shall be made on all newly mined Canadian gold deposited with the Mint and this charge shall be increased to \$1.00 the ounce fine on all other gold accepted as a deposit.

The gross value of gold deposited for sale with the Royal Canadian Mint or the Dominion of Canada Assay Office, Vancouver, shall be the market price of gold in the country to which the Government is at the time of the receipt of the deposit exporting gold, converted into Canadian funds at the average of the buying rates of exchange of that country reported to the Department of Finance by the Bank of Canada at 11 a.m. daily during the week in which the gold is deposited with the Mint or Assay office.

In addition to newly-mined Canadian gold there may be accepted at the Mint gold (over 1 ounce troy—fine) in the following forms:—old jewellery and dental scrap, provided it has not been melted or otherwise treated in any way to prevent its origin being readily recognized; scrap from manufacturers and refiners the result of processes carried out by them in the ordinary course of their business; gold coin which when of full weight and fineness, is not legal tender in Canada. Satisfactory evidence as to the origin of the gold shall be furnished by the depositor if required.

Delivery of deposits shall be accepted at the Mint counter only, free of all charges, and when bullion is forwarded by mail or express the original packages will not ordinarily be opened until an invoice of the description and weight of their several contents has been received. When there is a serious discrepancy between the actual and invoice weights of any deposit, further action in regard to it will be deferred pending communication with depositor.

The gross value of a deposit shall be calculated at a rate of one dollar for each 23.22 grains fine gold contained therein (equivalent to \$20.6718 the ounce fine) and at a rate for all silver in excess of one per centum of the weight of the deposit after melting to be determined by the Minister of Finance—the rate to be paid for silver in any week shall be one cent below the average for that week of the daily London quotation for standard silver from Monday to Friday, inclusive, converted into the equivalent for fine silver in Canadian funds at the average of the daily rate of exchange between Montreal and London, calculated to the nearest one-eighth of a cent.

Income Tax Exemption to New Mines

With a view to stimulating exploration and development of mineral resources in Canada, certain exemptions from income tax are granted to new or re-opened mines coming into production. An amendment to the Income Tax Act, made in May, 1936, provides that any metaliferous mine coming into production between May 1, 1936, and January 1, 1940, shall be exempt from income tax for its first three fiscal periods following the commencement of production. The Minister of National Revenue, having regard to the production of ore in reasonable commercial quantities, shall determine which mines, whether new or old, qualify for this exemption, and a certificate will be issued accordingly. General regulations covering depletion allowance to precious metal mines are unchanged from the previous year and remain on the basis of $33\frac{1}{3}$ per cent for mining companies, with the allowance in the case of dividends received by shareholders standing at 20 per cent.

Table 34.—Production of New Gold in Canada, by Provinces and Sources, 1935 and 1936

(Gold at \$20-671834 per fine ounce)

	1935		1936	
	Fine troy ounces	\$	Fine troy ounces	\$
NOVA SCOTIA—				
In gold bullion and ores exported.....	9,376	193,819	11,960	247,235
Estimated exchange equalization on gold produced.....		136,123		171,724
Total Value—Canadian Funds.....		329,942		418,959
QUEBEC—				
In blister copper, in ores shipped and in gold bullion.....	470,552	9,727,173	666,905	13,786,150
Estimated exchange equalization on gold produced.....		6,831,552		9,575,532
Total Value—Canadian Funds.....		16,558,725		23,361,682
ONTARIO—				
*Porcupine area—In gold bullion.....	968,546	20,021,622	1,023,351	21,154,542
*Kirkland Lake—In gold bullion.....	948,044	19,597,808	965,165	19,951,731
*Other gold mines—In gold bullion.....	234,545	4,848,475	316,610	6,544,909
Copper-Nickel and other ores.....	69,201	1,430,512	73,377	1,516,837
Total.....	2,220,336	45,898,417	2,378,503	49,168,019
Estimated exchange equalization on gold produced.....		32,235,207		34,150,941
Total Value—Canadian Funds.....		78,133,624		83,318,960
MANITOBA—				
In gold bullion, ores shipped and in blister copper.....	142,613	2,948,072	139,273	2,879,028
Estimated exchange equalization on gold produced.....		2,070,479		1,999,705
Total Value—Canadian Funds.....		5,018,551		4,878,733
SASKATCHEWAN—				
In ores shipped to Canadian smelters and crude gold to Royal Canadian Mint.....	14,323	296,083	48,981	1,012,527
Estimated exchange equalization on gold produced.....		207,943		703,278
Total Value—Canadian Funds.....		504,026		1,715,805
ALBERTA—				
In alluvial gold.....	150	3,101	109	2,253
Estimated exchange equalization on gold produced.....		2,178		1,565
Total Value—Canadian Funds.....		5,279		3,818
BRITISH COLUMBIA—				
In alluvial gold.....	24,744	511,504	34,711	717,540
In gold bullion.....	191,138	3,951,173	212,251	4,387,617
In blister copper.....	5,170	106,873		
In base bullion and in matte and ores exported.....	170,581	3,526,222	204,976	4,237,230
Total.....	391,633	8,095,772	451,938	9,342,387
Estimated exchange equalization on gold produced.....		5,685,793		6,489,001
Total Value—Canadian Funds.....		13,781,565		15,831,388
YUKON AND NORTHWEST TERRITORIES—				
In alluvial gold.....	35,705	738,088	50,192	1,037,561
In ores shipped.....	202	4,175	167	3,452
Total.....	35,907	742,263	50,359	1,041,013
Estimated exchange equalization on gold produced.....		521,304		723,063
Total Value—Canadian Funds.....		1,263,567		1,764,076
Total for Canada.....	3,284,890	67,904,700	3,748,028	77,478,612
Total estimated exchange equalization on gold produced.....		47,690,579		53,814,809
Grand Total Value, including exchange.....		115,595,279		131,293,421

In 1935 the estimated average price of a troy ounce of fine gold in Canadian funds was \$35.19; in 1936 the corresponding price was \$35.03.

* Includes relatively small amounts of gold contained in slags, and ore shipped.

Table 35.—Production of Gold in Canada, by Principal Mines, 1936

Property and Province	Ore raised	Ore treated	Gold shipped	Mill capacity 24 hours	See footnote
	Tons	Tons	Fine ounces	Tons	
NOVA SCOTIA—					
Aubenback, Jas. R.....	3	3	2	(x)	(a)
Avon Gold Mines Ltd.....	726	726	246	40	(a)
Beaver Dam Gold Mines Ltd.....	*360	360	60	10	(a)
Consolidated Mining & Smelting Company of Canada, Limited (Caribou-Holman).....	272	272	96	15-20	(a)
Deal, Andrew (Centre Rawdon).....	*33	33	14	4-5	(a)
Douglas, L. H. (Whiteburn).....	*145	145	27	10	(a)
Giffin Gold Mines Ltd.....	80	80	34	12	(a)
Gold River Mining Syndicate Ltd.....	29	30	6	12	(a)
Grant, J. A. & Co. (Stanburn).....	109	109	9	7	(a) (b)
Guysborough Mines Limited.....	40,758	28,748	5,153	100	(a) (g)
Higgins and Lawlor (Moose River).....	(x)	121	125	15	(a) (d)
Hogan, F. V. (Mt. Uniacke).....	57	57	17	24	(a)
Horne, E. D. (Renfrew).....	60	60	*5	15	(a)
Lake Thomas Syndicate Limited (Dominion).....	3,100	2,219	837	20	(a)
McDonald-Hudson (Country Harbour).....	62	62	11	20	(a)
Metals Associates Ltd. (Kemptonville).....	(x)	100	12	25	(a)
Mineral Industries Ltd. (Dolliver).....	81	81	8		(a)
Mineral Industries Ltd. (Victoria).....	137	137	25		(a)
Mineral Industries Ltd. (Wine Harbour).....	429	429	32		(a)
Mines Development Corp. (Mt. Uniacke).....	(x)	(x)	171	(x)	(x)
Montague Gold Mines Ltd.....	10,803	10,803	1,944	50	(a) (i)
Montreal Mining Co. Ltd. (Mt. Uniacke).....	82	(e) 82	*10	20	(a)
Montreal Mining Co. Ltd. (Oldham).....	*15	15	4		(a)
Moose River Gold Mines.....	150	150	*36	1	(a)
Otter Lake Gold Syndicate Ltd.....	241	120	32	(f) 25	(a) (f)
Queens Mines Limited.....	1,608	1,608	60	30	(a)
Richland Gold Mines Ltd.....	64	64	12	20	(a)
Seal Harbour Gold Mines Ltd.....	24,711	24,120	1,848	200	(a) (c)
United Gold Fields of Nova Scotia Limited.....		647	(e) 34	(h) 12	(a)
Waverley Consolidated Gold Mines Limited.....	356	356	22	20	(a)
In silver-lead-zinc and other gold ores.....	(x)	(x)	1,068		
Total—Nova Scotia.....			11,960		
QUEBEC—					
Arntfield Gold Mines Ltd.....	68,074	67,880	8,707	175	(c)
Beattie Gold Mines Limited.....	551,830	551,030	68,396	1,500	(c) (b) (d)
Belleterre Mines Limited.....	9,868	10,342	958	100	(c)
Canadian Malartic Gold Mines Limited.....	121,922	121,922	19,939	300	(c)
Green Stabell Mines Limited.....	24,114	21,220	2,328	100	(a) (b) (c)
Lamaque Gold Mines Ltd.....	201,356	201,356	76,488	500	(c)
McWatters Gold Mines Limited.....	37,375	(e) 44,633	16,569	150	(a) (c)
Mines Development Corp. (Randall).....	(x)	(x)	55	50-60	(x)
O'Brien Gold Mines Ltd.....	26,616	26,513	20,294	80	(a) (c) (f)
O'Neil-Thompson Gold Mines Ltd.....	2,700	2,700	79	25-35	(a) (g)
Perron Gold Mines Limited.....	70,000	52,124	13,304	350	(a) (c) (h)
Shawkey Gold Mining Co. Ltd.....	40,615	40,615	7,325	125	(a) (c) (i)
Siscoe Gold Mines Ltd.....	182,302	181,177	68,260	564	(a) (c)
Stadacona Rouyn Mines Ltd.....	17,454	9,116	1,053	200	(c) (j)
Sullivan Consolidated Mines Ltd.....	76,147	46,032	17,901	150	(a) (c)
Thompson-Cadillac Mining Corporation.....	19,603	14,226	2,378	90	(a) (b)
Wahu Mines Limited.....	50	(x)	5	35	(x)
Copper-gold-silver ores (anodes).....			341,891		
Silver-lead-zinc ores.....			975		
Total—Quebec.....			666,905		
ONTARIO—					
Porcupine Area—					
Anglo-Huronian Limited (Vipond).....	105,369	105,487	13,191	300	(c)
Buffalo-Ankerite Gold Mines Ltd.....	271,736	271,736	53,877	900	(c)
Coniaurum Mines Limited.....	168,715	168,715	39,587	500	(c)
Dome Mines Limited.....	553,900	553,900	208,528	1,500	(a) (c)
Gillies Lake Porcupine Gold Mines Ltd.....	20,253	15,903	4,748	60	(a) (c)
Hollinger Consolidated Gold Mines (Timmins).....	1,755,772	1,755,768	413,966	6,000	(c)
Hollinger Consolidated Gold Mines (Ross).....	27,540	27,540	6,365	80-100	(c)
McIntyre Porcupine Mines Limited.....	869,000	869,000	230,822	1,500	(c)
Pamour Porcupine Mines Limited.....	163,762	138,187	23,119	500	(c)
Paymaster Consolidated Mines Limited.....	141,922	140,962	27,766	500	(c)
Other sources.....	(x)	(x)	1,382		
McLaren-Porcupine Gold Mines Limited.....	2,000	594	(x)	10-15	(a)
Total Porcupine Area.....			1,023,351		
Kirkland Lake Area—					
Bidgood Kirkland Gold Mines Ltd.....	26,518	26,518	10,282	100	(c)
Bourkes Syndicate.....	11	11	45	2	(a)
Golden Gate Mining Co. Ltd.....	25	25	43		(b)
Golden Summit Mines Ltd.....	1,634	737	44	15	(a) (d)

Table 35.—Production of Gold in Canada, by Principal Mines, 1936—Continued

Property and Province	Ore raised	Ore treated	Gold shipped	Mill capacity 24 hours	See footnote
	Tons	Tons	Fine ounces	Tons	
ONTARIO—Concluded					
<i>Kirkland Lake Area—Concluded</i>					
Kirkland Lake Gold Mining Co. Ltd.	84,679	84,679	21,256	225	(c)
Lake Shore Mines Ltd.	887,571	887,571	451,847	2,300	(c)
Macassa Mines Limited	70,808	70,878	35,894	200	(c)
Morris Kirkland Gold Mines Ltd.	(x)	3,130	503	100	(e) (e)
Omega Gold Mines Ltd.	113,897	113,897	13,168	400	(c)
Sylvanite Gold Mines Ltd.	160,528	162,185	59,789	475	(c)
Teck Hughes Gold Mines Ltd.	367,814	367,814	(f) 135,262	1,225	(c)
Toburn Gold Mines Limited	34,440	34,440	20,577	100	(c)
Wright-Hargreaves Mines Ltd.	400,310	400,310	216,210	1,200	(c)
Other sources	(x)	(x)	245	(x)	(g)
Total Kirkland Lake Area			965,165		
Other Gold Mining Areas—					
Algold Mines Limited	(x)	3,073	427	35	(a)
Algoma Summit Gold Mines Ltd.	2,711	2,711	242	(x)	(a)
Ardeen Gold Mines Limited	42,074	39,545	6,273	200	(c)
Argosy Gold Mines Limited	(x)	9,872	3,715	58	(c)
Ashley Gold Mining Corp. Limited	25,802	21,958	4,509	125	(c)
Bousquet Gold Mines Limited	(x)	9,168	2,116	(x)	(x)
Car Lake Syndicate	(x)	307	77	10	(a)
Central Patricia Gold Mines Ltd.	58,466	58,466	32,627	175	(c)
Cooper and Barry (Birch Lake)	(x)	587	135	(x)	(c)
Darwin Gold Mines Limited	16,634	17,598	6,598	50	(a) (c)
Deep Lake Gold Mines	2,415	2,415	1,405	25	(a) (h)
Duport Mining Co. Limited	(x)	651	2,474		(b)
Elora Gold Mines	1,532	1,477	278	50	(a)
Gomak Mines Limited	(x)	1,387	98	35	(a) (i)
Hillside Mines Limited	(x)	50		15	Test
Hollinger Consolidated Gold Mines (Young-Davidson)	301,163	301,163	25,431	600	(c)
Howey Gold Mines Limited	528,528	528,528	(j) 35,583	1,100	(c)
Hudson Patricia Gold Mines Limited	(x)	8,228	1,566	50	(c)
J. M. Consolidated Gold Mines Limited	8,200	12,180	3,397	100	(a) (c)
Kenland Gold Mines Limited	4,121	4,121	638	50	(a) (k)
Kenora Prospectors Limited	12,404	13,882	4,097	50	(a) (k)
Leitch Gold Mines Limited	(x)	(x)	58		(b)
Little Long Lac Gold Mines Ltd.	108,398	83,555	42,825	250	(a) (c)
Matachewan Consolidated Mines Ltd.	55,189	55,797	12,119	100	(c)
McKenzie Red Lake Gold Mines Ltd.	61,611	52,465	21,310	150	(c)
McMillan Gold Mines Ltd.			89	140	(a) clean-up
Minto Gold Mines Limited	39,385	39,385	4,297	100	(c)
Northern Empire Mines Co. Ltd.	64,681	64,645	28,574	175	(c)
North Shores Mines Limited	(x)	2,214	750	25	(a)
Parkhill Gold Mines Limited	22,388	22,441	9,440	75-80	(c)
Pickle Crow Gold Mines Limited	63,758	63,758	45,975	150	(a) (c)
Red Crest Gold Mines Limited	417	417	168	5-9	(a) sampling
Red Lake Gold Shore Mines Ltd.	17,876	14,252	3,951	125	(c)
St. Anthony Gold Mines Limited	28,408	28,043	4,564	125	(c)
S. B. Smith Mine	1,282	1,282	320	50	(a) (k)
Sol D'Or Gold Mines Limited	34	34	31	(x)	(a)
Stanley Gold Mines Limited	2,027	1,963	84	35-50	(a)
Sturgeon River Gold Mines Limited	1,953	1,290	591	40	(a)
Tashota Goldfields Limited	25,324	23,590	6,311	75	(a) (k)
Wendigo Gold Mines Ltd.	11,868	15,936	3,296	50	(c) (k)
Miscellaneous gold mines			171		
Total Other Gold Mines			316,610		
Nickel-copper mines			73,377		
Total—Ontario—All Mines			2,378,503		
MANITOBA—					
Central Manitoba Mines Ltd.	41,129	37,434	12,094	150	(a) (c) (b)
Diana Gold Mines Limited	(x)	(x)	480	200	(a)
God's Lake Gold Mines Ltd.	54,505	54,505	18,221	150	(a) (c)
Gunnar Gold Mines Ltd.	*35,294	35,294	10,809	150	(c) (d)
Laguna Gold Mines Ltd.	10,532	9,014	4,711	50	(a)
San Antonio Gold Mines Ltd.	112,098	112,416	29,040	300	(a) (c)
Forty-Four Mines	(x)	71	19		
Copper-gold-silver ores (blister copper)			63,899		
Total—Manitoba			139,273		
SASKATCHEWAN—					
Copper-gold-silver ores (blister copper)			48,981		

Table 35.—Production of Gold in Canada, by Principal Mines, 1936—Continued

Property and Province	Ore raised	Ore treated	Gold shipped	Mill capacity 24 hours	See footnote
	Tons	Tons	Fine ounces	Tons	
ALBERTA—					
Placer gold.....			109		
BRITISH COLUMBIA—					
Amandy Mines.....	(x) 56	56	30	(x)	(d)
Ashloo Gold Mining Syndicate.....	2,774	2,774	1,164	25	(b)
Bayonne Consolidated Mines Limited.....	2,666	2,666	824	50	(c)
Black Cock Mines Limited.....	1,207	1,207	216		(b)
Bralorne Mines Limited.....	167,264	167,264	63,829	450	(a) (b) (e)
Cariboo Gold Quartz Mining Co. Ltd.....	51,634	51,760	18,516	200	(c)
Clubine Comstock Gold Mines Ltd.....	(x) 703	703	733		(f)
Danzig Mines Inc.....	(x) 10	10	18		(f)
Dentonia Mines Ltd.....	11,612	11,612	4,178	100	(b)
Esperanza Mines Ltd.....	1,320	1,320	37	20	(d) (g)
Fairview Amalgamated Gold Mines Ltd.....	12,960	12,960	1,511	100	(b)
Forshaw, R. (Brooklyn).....	269	269	19	50	(b)
Gormley Bros. (Venus Juno).....	107	107	152		(f)
Greenbridge Gold Mines Ltd.....	189	189	102		(f)
Havilah Gold Mines Ltd.....	(x) 7	7	15		(f)
Hedley Mascot Gold Mines Limited.....	30,265	29,962	13,524	150	(b)
Home Gold Mining Co. Ltd.....	1,800	1,050	163	18	(b)
Island Mountain Mines Co. Ltd.....	43,649	43,649	18,248	125	(c)
I. X. L. Leasers Limited.....	361	361	804		(f)
Kamloops Homestake Mines Limited.....	1,103	1,103	12	50	(b) see *
Kelowna Exploration Co. Ltd.....	64,594	64,854	22,613	200	(c) (b)
Kootenay Bell Gold Mines Ltd.....	21,864	15,508	6,977	100	(a) (b)
Kootenay Ore Hill Gold Mines Ltd.....	(x) 426	426	685		(f)
Livingstone Mining Co. Ltd.....	1,414	1,414	520	30	(a) (b) (f)
Loughborough Gold Mines Limited.....	49	49	88		(f)
McArthur, W. E. (No. 7).....	1,153	1,039	191		(f)
McArthur, W. E. (North Star).....	170	170	96		(f)
McArthur, W. E. (Sky Lark).....	99	99	31		(f)
McArthur, W. E. (Granby).....	(x) 4,611	4,611	516	50	(d)
McArthur, W. E. (Atholstan).....	603	603	373		(f)
McCarthy, J. F. (Union).....		20,174	601	200	(d)
Meridian Mining Co.....	27,273	(x)	5,790	100	(d)
Minto Gold Mines.....	29,392	29,271	8,055	120	(a) (i)
O.K. Leasing Co.....	64	64	17		(f)
Oscarson, R. C. (Arlington).....	546	546	622		(b)
Osoyoos Mines Limited.....	7,500	7,110	1,586	50	(b)
Pioneer Gold Mines Limited.....	154,881	145,847	69,407	300	(c)
Relief Arlington Mines Ltd.....	34,776	25,462	10,097	75	(c)
Reno Gold Mines Limited.....	42,751	42,705	28,083	120	(a) (c) (i)
Reward Mining Co. Ltd.....	(x) 112	112	122		(f)
Riegel Mines Ltd.....	357	357	448		(f)
Sheep Creek Gold Mines Ltd.....	54,967	54,967	16,184	150	(c)
Silbak Premier Mines Ltd.....	192,442	192,442	43,166	500	(b)
Surf Inlet Consolidated Gold Mines Limited.....	5,540	4,569	1,455	100	(b)
N. A. Timmins Corporation (Surf Point).....	15,215	7,391	(k) 3,374	22	(b) (l)
Vancouver Island Gold Mines Ltd.....	75	75	38	25	(c)
Velvet Gold Mining Company.....	5,592	5,592	763	100	(b)
Vidette Gold Mines Ltd.....	12,202	12,352	8,539	70	(i)
Wayside Consolidated Gold Mines Limited.....	38,000	37,535	4,390	100	(a)
Wesko Mines Limited.....	(x) 6,043	6,043	910	100	(b) (m)
Wilcox Mining Syndicate.....	2,600	2,600	733	20	(a) (i)
Windpass Gold Mining Co. Limited.....	17,579	16,683	6,995	50	(b)
Ymir Consolidated Gold Mines Ltd.....	11,816	11,816	3,016	100	(b)
Ymir Yankee Girl Gold Mines Ltd.....	43,149	43,378	11,520	100	(c) (i)
Placer gold.....			34,711		
Copper-gold; silver-lead—and other mines.....			35,181		
Total—British Columbia.....			451,938		
NORTHWEST TERRITORIES—					
Bear Exploration and Radium.....	(x)	(x)	1	(x)	(x)
YUKON TERRITORY—					
Placers.....			50,192		
Silver-lead ores.....			166		
Total—Yukon.....			50,358		
Grand Total—Canada.....			3,748,028		

Table 35.—Production of Gold in Canada, by Principal Mines, 1936—Concluded

NOTES.—In addition to gold produced, many mines listed, especially in British Columbia, produce important quantities of silver, lead and zinc.

NOVA SCOTIA—

- (x) Information not available.
- (a) Amalgamation.
- * Estimate.
- (b) Experimental.
- (g) In addition produced and stock piled 166 tons concentrates assaying .509 oz. gold per ton.
- (d) Actual recovery 96 crude oz.
- (e) Mined during previous years.
- (f) In addition .5 tons of concentrates produced and stored (1.15 oz. Au per ton).
- (c) Cyanide.
- (h) In addition 12 tons of concentrates were produced and stored.
- (i) Also includes gold in concentrates shipped.

QUEBEC—

- (x) Information not available.
- (a) Amalgamation.
- (b) Includes gold in concentrates shipped for smelting.
- (c) Cyanide.
- (d) Some 171 fine ounces recovered as bullion in excess of shipments, also some concentrates stored.
- (e) Less 2,203 tons eliminated at crusher.
- (f) 232 oz. gold recovered as bullion in excess of shipments.
- (g) Blankets.
- (h) 728 oz. gold recovered as bullion in excess of shipments.
- (i) 56 oz. gold recovered as slag in excess of shipments.
- (j) Milling commenced Nov. 5, 1936.
- (k) Includes 36 ounces shipped from the Granada mine.

ONTARIO—

- (x) Information not available.
- (a) Amalgamation.
- (b) In crude ore shipped.
- (c) Cyanide.
- (d) Test milling.
- (e) Commenced milling Nov. 2, 1936.
- (f) In addition, 35,898 tons of tailings were re-treated.
- (g) Barry-Hollinger clean up, etc.
- (h) Also produced and stored 15 tons of concentrates assaying 1 oz. gold per ton.
- (i) Also produced and stored 27 tons of concentrates—gold content not known.
- (j) Includes 89,884 tons discarded by sorting.
- (k) In bullion and concentrates shipped.

MANITOBA—

- (x) Information not available.
- * Estimate.
- (a) Amalgamation.
- (c) Cyanide.
- (b) Shipped 61 oz. gold in excess of recoveries.
- (d) Includes 2,104 tons of ore sorted.

BRITISH COLUMBIA—

- (x) Information not available.
- (a) Amalgamation.
- (b) In concentrates shipped to smelter.
- (c) Cyanide.
- (d) In crude ore and concentrates shipped to smelter.
- (e) 1,203 oz. gold recovered in excess of shipments.
- (f) In crude ore shipped to smelter.
- (g) Includes ore taken from dumps.
- (h) Tailings.
- (i) In bullion and concentrates shipped.
- (j) 512 oz. shipped in excess of year's recovery.
- (k) Not including 7,824 tons sorted.
- (l) Also on hand 86 tons concentrates assaying 7.7 oz. gold per ton.
- (m) Commenced milling Nov. 1, 1936.

Table 36.—Production of Gold in Canada, 1927-1936

Year	Fine ounces	Value*	Year	Fine ounces	Value*	Value in Canadian funds
		\$			\$	\$
1927.....	1,852,785	38,300,464	1931.....	2,693,892	55,687,688	58,093,396
1928.....	1,890,592	39,082,005	1932.....	3,044,387	62,933,063	71,479,373
1929.....	1,928,308	39,861,663	1933.....	2,949,309	60,967,626	84,350,237
1930.....	2,102,068	43,453,601	1934.....	2,972,074	61,438,220	102,536,553
			1935.....	3,284,890	67,904,700	115,595,279
			1936.....	3,748,028	77,478,612	131,293,421

NOTE.—For years 1858 to 1926, see previous reports.

*Calculated from the value \$1=0.048375 ounces.

Table 37.—Quantity and Value of Gold Produced in Canada, by Provinces, 1927-1936

(For the years 1862 to 1926, see Mineral Production of Canada, 1928)

Year	Nova Scotia			Quebec		
	Fine oz.	Valued at \$20-671834 per fine oz.	Value in Canadian dollars	Fine oz.	Valued at \$20-671834 per fine oz.	Value in Canadian dollars
		\$	\$		\$	\$
1927.....	3,151	65,137	.....	8,331	172,217	.....
1928.....	1,290	26,667	.....	60,006	1,240,434	.....
1929.....	2,687	55,545	.....	90,798	1,876,961	.....
1930.....	1,272	26,295	.....	141,747	2,930,170	.....
1931.....	460	9,503	9,320	300,075	6,203,101	6,471,075
1932.....	964	19,928	22,634	401,105	8,291,576	9,417,572
1933.....	1,382	28,568	39,525	382,886	7,914,956	10,950,539
1934.....	3,525	72,868	121,613	390,097	8,064,020	13,458,347
1935.....	9,376	193,819	329,942	470,552	9,727,173	16,558,725
1936.....	11,960	247,235	418,959	666,905	13,786,150	23,361,682

Year	Ontario			Manitoba		
	Fine oz.	\$	\$	Fine oz.	\$	\$
1927.....	1,627,050	33,634,108	.....	182	3,762	.....
1928.....	1,578,434	32,629,126	.....	19,813	409,571	.....
1929.....	1,622,267	33,535,234	.....	22,455	464,186	.....
1930.....	1,736,012	35,886,552	.....	23,189	479,359	.....
1931.....	2,085,814	43,117,600	44,980,280	102,969	2,128,558	2,220,512
1932.....	2,280,105	47,133,952	53,534,743	122,507	2,532,444	2,876,350
1933.....	2,155,519	44,558,351	61,647,843	125,310	2,590,388	3,583,866
1934.....	2,105,339	43,521,218	72,634,195	132,321	2,735,318	4,565,075
1935.....	2,220,336	45,898,417	78,133,624	142,613	2,948,072	5,018,551
1936.....	2,378,503	49,168,019	83,318,960	139,273	2,879,028	4,878,733

Year	Saskatchewan			Alberta		
	Fine oz.	\$	\$	Fine oz.	\$	\$
1927.....	.....	.....	.....	42	868	.....
1928.....	.....	.....	.....	68	1,406	.....
1929.....	.....	.....	.....	5	103	.....
1930.....	.....	.....	.....	.....	.....	.....
1931.....	.....	.....	.....	195	4,031	4,205
1932.....	11	227	258	83	1,716	1,949
1933.....	5,400	111,628	154,440	324	6,698	9,267
1934.....	5,405	111,731	186,472	393	8,124	13,553
1935.....	14,323	296,083	504,026	150	3,101	5,279
1936.....	48,981	1,012,527	1,715,805	109	2,253	3,818

Year	British Columbia			Yukon*		
	Fine oz.	\$	\$	Fine oz.	\$	\$
1927.....	183,094	3,784,889	.....	30,935	639,483	.....
1928.....	196,617	4,064,434	.....	34,364	710,367	.....
1929.....	154,204	3,187,680	.....	35,892	741,954	.....
1930.....	164,331	3,397,023	.....	35,517	734,202	.....
1931.....	160,069	3,308,920	3,451,865	44,310	915,969	955,539
1932.....	199,004	4,113,778	4,672,429	40,608	839,442	953,438
1933.....	238,995	4,940,465	6,835,257	39,493	816,392	1,129,500
1934.....	296,196	6,122,915	10,218,762	38,798	802,026	1,338,531
1935.....	391,633	8,095,772	13,781,565	35,907	742,263	1,263,567
1936.....	451,938	9,342,387	15,831,388	50,359	1,041,013	1,764,076

*Includes 200 fine oz. contained in ore shipped from the Northwest Territories in 1935 and 1 fine oz. in 1936.

DOMINION BUREAU OF STATISTICS

Table 38.—Total Gold Production in Ontario*

(Gold at \$20-671834 per oz.)

Year	Total production	Porcupine belt		Kirkland Lake belt		N.W. Ontario (c)	
	\$	\$	per cent	\$	per cent	\$	per cent
1866-1891.....	†190,258						
1892-1909.....	‡2,509,492						
1910.....	68,498	35,539	51.8				
1911.....	42,637	15,437	36.2				
1912.....	2,114,086	1,730,628	81.8				
1913.....	4,558,518	4,294,113	94.1	86,316	1.9		
1914.....	5,544,979	5,206,006	93.8	114,154	2.0		
1915.....	8,501,391	7,462,111	88.6	551,099	6.5		
1916.....	10,339,259	9,391,408	90.8	702,761	6.8		
1917.....	8,698,735	8,229,744	94.5	404,346	4.6		
1918.....	8,502,480	7,767,907	91.4	632,007	7.4		
1919.....	10,451,709	9,941,803	95.1	486,809	4.7		
1920.....	11,686,043	10,597,572	90.7	1,033,478	8.8		
1921.....	14,692,357	13,103,526	89.5	1,524,851	10.4		
1922.....	20,579,569	18,374,658	89.3	2,159,581	10.5		
1923.....	20,136,287	17,313,115	85.9	2,719,939	13.5		
1924.....	25,669,303	22,135,534	86.2	3,446,632	13.4		
1925.....	30,206,432	24,733,120	81.8	5,385,256	17.8		
1926.....	30,950,753	23,680,670	76.5	7,174,083	23.2		
1927.....	33,627,040	23,851,857	70.9	9,674,114	28.7		
1928.....	32,629,111	20,246,319	62.0	12,233,524	37.5		
1929.....	33,535,226	19,281,286	57.6	14,046,596	41.8	22,988	0.07
1930.....	35,886,558	17,758,842	49.6	17,172,770	47.9	461,730	1.3
1931.....	43,117,615	19,891,521	46.2	21,734,729	50.4	1,007,756	2.3
1932.....	47,284,621	21,422,117	45.2	23,782,313	50.3	1,607,831	3.4
1933.....	44,558,514	21,624,617	48.5	20,817,277	46.7	1,352,017	3.0
1934.....	43,521,249	19,634,097	45.0	20,424,716	46.9	2,214,385	5.0
1935.....	45,898,372	20,021,622	43.6	19,597,809	42.7	4,851,950	10.6
1936.....	49,168,253	21,154,555	43.0	19,951,731	40.5	6,545,127	13.3
Total to end of 1936.....	624,669,345	388,899,724	62.3	205,856,861	32.9		

†Estimated. ‡Maximum yearly output was \$424,568 in 1899.

(c) Recent production only. Gold output from year 1866 to 1909, inclusive, came from Hastings County and North-western Ontario; no segregation of statistics can now be made.

*Ontario Department of Mines.

Table 39.—World Production of Gold Ore, 1934-1936

(In terms of metal) (Supplied by Imperial Institute)

Producing Country	1934	1935	1936	Producing Country	1934	1935	1936
	Fine ounces	Fine ounces	Fine ounces		Fine ounces	Fine ounces	Fine ounces
BRITISH EMPIRE—				FOREIGN COUNTRIES—			
United Kingdom.....	51	148	1	Bulgaria.....	14	17	(a)
Anglo-Egyptian Sudan.....	5,398	8,551	7,659	Czechoslovakia.....	11,990	14,334	11,013
Bechuanaland Protectorate.....	9,485	11,418	16,748	Finland.....	(a)	(a)	4,983
Gold Coast.....	326,040	358,835	428,144	France.....	101,498	91,595	95,614
Kenya.....	12,110	23,009	38,463	Germany.....	5,769	5,957	7,584
Nigeria.....	37,023	38,962	33,364	Hungary.....	2,167	2,070	1,093
Northern Rhodesia.....	2,113	1,647	4,452	Italy.....	3,396	4,000	8,900
Southern Rhodesia.....	691,152	726,281	797,061	Norway.....	129	231	42
Sierra Leone.....	21,205	30,753	37,966	Portugal.....			3,282
South West Africa.....	908	3,206	4,065	Roumania.....	111,496	150,169	(a)
Swaziland.....	379	314	276	Spain.....	7,596	3,800	(a)
Tanganyika Territory.....	42,606	52,182	69,675	Sweden.....	246,687	180,554	158,339
Uganda.....	5,842	5,651	13,231	U.S.S.R. (Russia) (b).....	3,800,000	4,500,000	5,500,000
Union of South Africa.....	10,479,857	10,773,991	11,336,214	Yugoslavia.....	74,106	78,607	84,876
Canada.....	2,972,074	3,284,890	3,748,028	Belgian Congo.....	329,441	376,163	402,486
Newfoundland.....	11,219	12,728	16,114	Cameroon (French).....	450	2,829	11,027
British Guiana.....	25,420	30,488	32,234	Egypt.....	201	58	278
Cyprus.....	13,092	(c) 6,872	(c) 20,991	Eritrea.....	8,000	5,000	(a)
Federated Malay States.....	30,221	29,771	37,779	French Equatorial Africa.....	29,160	29,657	22,100
Unfederated Malay States.....	1,197	276	761	French West Africa (exports).....	97,706	125,671	114,416
India.....	322,100	327,600	333,300	Madagascar.....	15,979	15,464	15,200
Sarawak.....	28,842	28,549	23,372	Morocco (French zone).....		780	1,500
Australia.....	886,609	917,262	1,175,066	Mozambique.....	10,196	7,579	16,711
Fiji.....	931	6,728	16,955	Costa Rica.....	25,997	21,662	32,500
New Guinea.....	190,000	194,000	226,000	Dominican Republic.....	5,312	7,553	8,901
New Zealand.....	160,248	165,277	164,575	Guatemala.....	7,500	4,214	1,824
Papua.....	12,591	17,012	20,719	Honduras.....	12,996	12,274	17,982
				Nicaragua.....	(d) 18,362	24,789	23,123
Total.....	16,290,000	17,060,000	18,600,000	Panama.....	15,053	5,198	9,189
				Porto Rico.....	57	63	482

(a) Information not available.

(b) Approximate figures only. It is not possible to form any reliable estimate from the data given in Russian Publications.

(c) Exports.

(d) Imports into the United States from country indicated.

Table 39.—World Production of Gold Ore, 1934-1936—Concluded

Producing Country	1934	1935	1936	Producing Country	1934	1935	1936
	Fine ounces	Fine ounces	Fine ounces		Fine ounces	Fine ounces	Fine ounces
FOREIGN COUNTRIES—Con.				FOREIGN COUNTRIES—Con.			
Salvador.....	6,824	8,129	8,928	China.....	105,591	(a)	(a)
Mexico.....	661,390	682,319	753,950	Formosa (estimated).....	84,000	85,000	85,000
United States.....	2,778,789	3,236,951	3,768,062	French Indo-China.....	7,105	8,552	9,025
Argentina (estimated).....	9,900	11,400	12,200	Japan.....	486,963	589,030	657,135
Bolivia (exports).....	112	.....	10	Korea.....	420,000	540,000	650,000
Brazil.....	110,900	119,084	125,674	"Manchoukuo".....	46,767	(a)	(a)
Chile.....	237,656	265,938	257,171	Netherlands East Indies.....	71,865	68,249	71,300
Colombia.....	344,310	328,991	389,495	Philippine Islands.....	340,314	451,818	599,957
Dutch Guiana (crude).....	11,887	11,340	14,258				
Ecuador.....	72,569	102,296	70,124	Total.....	11,000,000	12,500,000	14,600,000
French Guiana (exports).....	45,524	47,421	45,557				
Peru.....	98,850	110,959	152,405	World's Total.....	27,300,000	29,600,000	33,200,000
Venezuela.....	109,055	112,390	109,994				

Table 40.—Comparative Figures of Gold Production for the World Since the Discovery of America, also Production for Russia, Transvaal, United States and Canada

Period	Russia (a)	Transvaal since the commencement of Fields (b)	*United States (a)	Canada since the recording of Production in 1858	(a) World since the discovery of America
	Fine ounces	Fine ounces	Fine ounces	Fine ounces	Fine ounces
1493-1600.....					24,266,820
1601-1700.....					29,330,445
1701-1800.....					61,088,215
1801-1840.....					20,488,552
1841-1850.....			(c) 1,187,170		17,605,018
1851-1860.....				220,039	64,482,933
1861-1870.....			(d) 58,279,778	1,477,999	61,098,343
1871-1880.....			(e) 15,281,264	904,093	55,670,618
1881-1890.....		1,070,651	15,808,339	584,102	51,280,184
1891-1895.....		6,870,158	9,106,834	291,564	39,412,823
1896-1900.....		12,578,869	15,728,572	3,469,791	62,234,698
1901-1905.....		13,632,908	19,393,722	4,592,261	78,033,650
1906.....		5,792,823		556,415	19,471,080
1907.....		6,450,740		405,517	19,977,260
1908.....		7,056,266		476,112	21,422,244
1909.....		7,295,108		453,865	21,965,111
1910.....		7,527,108		493,707	22,022,180
1911.....		8,249,461	4,687,053	473,159	22,397,136
1912.....		9,107,512	4,520,719	611,885	22,605,068
1913.....	1,583,677	8,798,336	4,299,784	802,973	22,556,347
1914.....	1,733,914	8,394,322	4,572,976	773,178	21,652,883
1915.....	1,382,450	9,093,902	4,887,604	918,056	22,846,608
1916.....	1,089,885	9,296,618	4,479,057	930,492	22,032,542
1917.....	871,265	9,018,084	4,051,440	738,831	20,346,043
1918.....	554,588	8,418,292	3,320,784	699,681	18,588,127
1919.....	173,610	8,331,294	2,918,628	766,764	17,339,679
1920.....	73,945	8,158,226	2,476,166	765,007	16,146,830
1921.....	65,907	8,128,681	2,422,006	926,329	15,997,692
1922.....	191,614	7,009,767	2,363,075	1,263,364	15,496,859
1923.....	305,425	9,148,771	2,502,632	1,233,341	17,845,349
1924.....	546,550	9,574,918	2,528,900	1,525,382	18,619,481
1925.....	632,390	9,597,573	2,411,987	1,735,735	18,673,178
1926.....	760,605	9,954,762	2,335,042	1,754,228	19,117,568
1927.....	688,492	10,122,459	2,197,125	1,852,785	19,058,736
1928.....	385,800	10,354,157	2,233,251	1,890,592	18,885,849
1929.....	707,300	10,412,326	2,208,386	1,928,308	19,207,452
1930.....	1,501,083	10,716,349	2,285,603	2,102,068	20,903,736
1931.....	1,655,725	10,877,708	2,395,878	2,693,892	22,284,290
1932.....	1,938,000	11,557,858	2,449,032	3,044,387	24,098,676
1933.....	2,700,000	11,012,340	2,556,246	2,949,309	25,400,295
1934.....	3,858,000	10,479,194	3,091,183	2,972,074	27,372,374
1935.....	15,800,000	10,773,041	3,609,283	3,284,890	30,001,209
1936.....	17,300,000	11,335,092	14,295,648	3,748,028	135,283,135
Total.....		316,189,483	239,878,385	56,309,703	1,224,607,316

*Including Philippine Islands production received in United States (1936 ounces 599,453).

†Preliminary estimate—American Bureau of Metal Statistics.

(a) Supplied by United States Mint.

(b) Supplied by Department of Mines, Union of South Africa.

(c) 1792-1847.

(d) 1848-1872.

(e) 1873-1890.

(f) Data not available for preceding years. A revision by the United States Mint of estimated Russian gold production for the years 1913 to 1934 was made from United States consular reports, based principally on Soviet publications. While available data are quite indefinite and, in many instances, contradictory, it is believed that this revision more nearly represents actual production than data heretofore used.

Table 41.—Source of Canadian Fine Gold Production, by Percentages, 1931-1936

	1931	1932	1933	1934	1935	1936
	%	%	%	%	%	%
In alluvial gold.....	2.1	1.8	2.0	2.0	1.84	2.27
In crude gold bullion*.....	80.6	79.3	79.8	78.68	78.83	77.37
In base bullion (from silver-lead ores, etc.).....	0.6	1.0	0.7	1.09	2.17	1.60
In blister copper.....	13.8	15.1	14.2	13.41	13.21	13.80
In ores, matte, slags, etc., exported.....	2.9	2.8	3.3	4.82	3.95	4.96
	100.00	100.00	100.00	100.00	100.00	100.00

*Includes a relatively small quantity of gold contained in interprovincial shipments of gold ores to smelters.

Table 42.—Imports into Canada and Exports of Gold, 1935 and 1936

(External Trade Branch—Dominion Bureau of Statistics)

Items	1935	1936
IMPORTS—		
Coins and bullion—		
Coins, British and Canadian and foreign gold coins.....	\$ 847,123	215,674
Gold coin (from April 1, 1936).....	\$	597,992
Coin, n.o.p. (from April 1, 1936).....	\$	863,855
Gold in bars, blocks, ingots, drops, sheets or plates, unmanufactured, n.o.p....	\$ 368,750	28,522
Total	\$ 1,213,873	1,706,043
Gold, other—		
Bullion fringe or gold fringe.....	\$ 15,771	8,633
Gold, silver, and Dutch or schlag metal leaf.....	\$ 62,430	61,724
Sweepings—Gold and silver.....	\$	321
Manufactured, n.o.p.....	\$ 24,285	26,565
Electroplated ware and gilt ware, n.o.p.....	\$ 439,613	1,077,866
Gold, unmanufactured, for commercial purposes.....	\$ 137,427	135,764
Total	\$ 679,526	1,310,873
EXPORTS—		
Coin and bullion—		
Gold coin—		
Canadian.....	\$ .....	.....
Foreign.....	\$ 9,601,367	4,746,207
Gold bullion, Canadian—monetary.....	.....	.....
Gold bullion, Foreign—monetary.....	.....	.....
Gold bullion—non-monetary—		
Canadian—To United Kingdom.....	oz. (96,992)	(126,845)
To United States.....	\$ 3,395,500	4,476,000
Foreign.....	oz. (2,649,419)	(1,912,392)
.....	\$ 92,594,734	67,012,985
.....	oz. ....	.....
.....	\$
Total—Canadian coin and bullion	\$ 95,990,234	71,488,985
Foreign coin and bullion	\$ 9,601,367	4,746,207
Grand Total—Coin and fine gold bullion	\$ 105,591,601	76,235,192
Gold-bearing quartz, dust, nuggets and crude bullion obtained direct from mining operations (gold content).....	oz. (125,434)	(172,176)
Jewellers' sweepings, and precious metal scrap, n.o.p.....	\$ 4,316,421	5,891,517
.....	\$ 772,725	825,251
Total ore, sweepings, etc.	\$ 5,089,146	6,716,768

In 1936 imports of liquid gold paint were valued at \$2,659.

MONETARY AND NON-MONETARY GOLD IN TRADE STATISTICS

The Bureau of Statistics has experienced difficulty in recent years in connection with the treatment of gold in trade statistics, especially in the case of exports. In former times there was some movement of gold from Canada in the form of gold-bearing quartz, dust, nuggets, and

bullion obtained direct from mining operations to the United States for refining purposes. These exports were recorded as merchandise. When the Royal Mint began refining gold in Ottawa, this gold-bearing quartz, dust, nuggets, etc., began to be exported in the form of gold bullion, and was recorded under the "Coin and Bullion" section.

The Bureau has been in conference with the Bank of Canada, and the Department of National Revenue, and has developed a policy whereby all gold bullion which goes out of the country as "Merchandise" will be entered as such, and will be recorded in total commodity exports. In consequence of this arrangement, Canada's exports and total trade have been revised from 1926 to date.

Table 43.—Estimated Balance of International Payments for Canada

PRELIMINARY STATEMENT FOR 1936

(Internal Trade Branch)

CURRENT ACCOUNT OF GOODS, SERVICES AND GOLD

(In million of dollars)

	Exports Visible and Invisible	Imports Visible and Invisible	Net Debit (—) or Credit (+)
	\$	\$	\$
1. Commodity trade (adjusted).....	953.9	627.0	+326.9
2. Exports and imports of gold coin and bullion ⁽¹⁾	126.8	1.0	+125.8
3. Freight receipts and payments, n.o.p.....	50.0	68.0	— 18.0
4. Tourist expenditures ⁽²⁾	250.0	85.0	+165.0
5. Interest and dividend receipts and payments.....	80.0	330.0	—250.0
6. Immigrant remittances.....	7.0	9.0	— 2.0
7. Government expenditures and receipts.....	6.5	12.0	— 5.5
8. Charitable and missionary contributions.....	1.0	1.5	— 0.5
9. Insurance transactions (net figure).....		16.0	— 16.0
10. Advertising transactions.....	2.3	1.8	+ 0.5
11. Motion picture earnings.....		3.0	— 3.0
12. Capital of immigrants and emigrants.....	1.9	3.5	— 1.6
13. Earnings of Canadian residents employed in the United States (net figure).....	1.6		+ 1.6
14. Miscellaneous payments, including direct magazine subscriptions, entertainers' earnings, etc. (net figure).....		5.0	— 5.0
15. Total credits and debits shown above.....	1,481.0	1,162.8	+318.2
16. Difference between credits and debits as above (This difference is made up of capital movements and errors and omissions).....		318.2	.....
	1,481.0	1,481.0	.....

CAPITAL ACCOUNT

(In millions of dollars)

	Cr.	Dr.	
	\$	\$	\$
1. Sales and purchases of securities.....	410.5	408.0	+ 2.5
2. Retirements.....		255.0	—255.0
3. New series (including refinancing).....	110.0		+110.0
4. Other known capital movements (net) ⁽³⁾		85.0	— 85.0
5. Balancing item—Net outflow of capital funds.....	227.5		.....
	748.0	748.0	.....

N.B.—If the estimates of the current and capital items above were absolutely correct and all inclusive, the balancing item of the current account (No. 16) and the balancing item of the capital account (No. 5) would be equal. The difference between these two amounts in the above statement (\$90.7 millions) represents either errors in the computations or the omission of transactions which could not be traced at the time the tables were prepared.

(1) Includes earmarked gold. Gold-bearing quartz is included in commodity trade.

(2) Provisional estimate. Final figures may differ substantially.

(3) Net movement of funds resulting from the operations of British and foreign branch plants in Canada and the branches of Canadian firms abroad, including the transactions of trust companies and known short-term movements of funds, n.o.p.

The data shown in table 43 reflects the importance of Canadian gold production as a factor of great economic importance in our national development.

Table 44.—Estimated Average Monthly Value of an Ounce of Fine Gold, Expressed in Canadian Funds

Month	1931	1932	1933	1934	1935	1936
	\$	\$	\$	\$	\$	\$
January.....	20.71	24.24	23.64	33.05	34.95	35.06
February.....	20.67	23.67	24.74	35.29	35.05	35.18
March.....	20.67	23.11	24.78	35.08	35.40	35.11
April.....	20.68	22.98	25.33	34.93	35.18	35.15
May.....	20.68	23.38	27.75	34.94	34.95	35.00
June.....	20.73	23.83	28.24	34.73	35.05	35.09
July.....	20.74	23.73	30.58	34.59	35.08	34.91
August.....	20.73	23.61	30.09	34.19	35.09	35.00
September.....	21.55	22.88	31.79	34.18	35.28	34.99
October.....	23.22	22.65	31.48	34.27	35.49	34.99
November.....	23.22	23.73	32.68	34.16	35.37	34.95
December.....	25.01	23.85	32.14	34.57	35.33	34.98
Yearly average.....	21.55	23.47	28.60	34.50	35.19	35.03

NOTE.—Procedure regarding the marketing of gold by the Department of Finance, Ottawa, is shown elsewhere in this report; also actual payment by the United States Treasury for gold in imported ores or concentrates is at 99.75 per cent of the price quoted by the United States Treasury, which in June, 1937, was equal to \$34.9125 (U.S.) per ounce.

Table 45.—Canadian Gold Stocks, 1925-1936

(Thousands of fine ounces)

December 31	Dominion Notes—Statutory Reserve	Chartered Bank—Gold in Canada ⁽¹⁾	Postal Savings—Bank Reserve	Free Gold—Balance of Minister of Finance	Total Gold Stock
1925.....	6,506	3,014	154	9	9,683
1926.....	6,187	3,115	150	9	9,461
1927.....	6,039	3,067	147	138	9,391
1928.....	4,152	2,961	141	221	7,475
1929.....	2,841	2,675	124	82	5,722
1930.....	4,398	2,612	117	140	7,267
1931.....	2,994	2,467	113	133	5,707
1932.....	3,395	2,056	109	29	5,589
1933.....	3,326	1,814	111	44	5,295
1934.....	3,183	1,822	107	285	5,397
	Bank of Canada Gold Reserve				
1935.....	5,158	1	105	136	5,400
1936.....	5,159	2	104	119	5,384

(1) Including gold coin deposited in the Central Gold Reserves.

NOTE.—The amounts of gold held by chartered banks in Canada in 1925-1934 exclude an estimated figure of subsidiary coin holdings in 1925-1928 and an actual figure reported by the banks for 1929-1934 (Supplied by the Bank of Canada.)

Table 46.—Fine Gold and Fine Silver Shipped to the Royal Canadian Mint, Ottawa, Canada, by Sources, 1935 and 1936

Source	1935		1936	
	Gold	Silver	Gold	Silver
	Fine ounces	Fine ounces	Fine ounces	Fine ounces
British Columbia.....	248,111-607	39,018-53	281,492-846	48,792-86
Alberta sundries.....	150-331	15-74	108-577	8-85
Saskatchewan sundries.....	9-148	0-45		
Manitoba.....	52,085-201	7,562-47	72,313-529	10,594-07
Ontario.....	2,195,386-202	310,104-48	2,346,528-522	379,692-68
Quebec.....	541,461-912	30,378-42	751,386-258	54,855-57
Nova Scotia.....	9,092-116	371-88	10,758-137	356-51
Jewellery and scrap.....	44,932-037	12,232-10	30,363-625	7,933-88
Vancouver Assay Office.....	65,508-547	14,186-48	93,437-787	18,692-34
Yukon sundries.....	2,030-129	534-69	6-585	1-76
Foreign coin.....			16,934-077	
Total.....	3,158,767-230	414,405-24	3,603,329-943	520,928-52

Table 47.—Fine Gold and Gold Alloys Used by the Canadian Jewellery and Silverware Industry, 1935-1936

Materials	Cost at works	
	1935	1936
	\$	\$
Fine gold.....	820,453	774,385
Gold alloys.....	27,231	49,062

PRECIOUS METALS MARKING ACT

"The safeguarding of the purity of precious metals when fabricated has, in the case of a majority of Governments, been under control. Prior to 1908, although measures were in existence in several countries requiring all gold and silver articles to be of a certain fineness before receiving the mark of approval of the country in which they were made, Canada was being flooded with inferior goods having all the appearance of the genuine articles and with marks of quality that were calculated to deceive the purchaser. As a result of the unfair competition created by such improperly marked goods, representations were made to the Government for the setting up of proper standards. With the object of protecting both the public and the manufacturer, the Gold and Silver Marking Act was passed establishing a standard for gold and silver as well as articles of gold and silver plate.

"The increasing use of platinum in the manufacture of jewellery necessitated its being brought under the provisions of the Act, which accordingly was amended in 1928 and the title changed to The Precious Metals Marking Act.

"An important requirement of the Act is that if an article is stamped with a mark of quality, then it must also be stamped with a trade mark registered in accordance with the Unfair Competition Act, 1932. In this manner responsibility for the quality stamp is fixed.

"Administration is effected mainly through the Inspector, whose duty it is to see that all articles coming under the Act made in, imported into or sold in Canada are of the standard required and that such articles must have applied to them marks that truly and correctly indicate the fineness of the metal employed in the manufacture of the articles.

"In the interest of more efficient administration of the Act, a list of all marks pertaining to articles of precious metals has been compiled from the records of the Trade Mark and Design Branch. This necessitated going carefully through over 63,000 marks and making a drawing of each mark registered for articles of precious metals, with full details of application."—4th Annual Report of Department of Trade and Commerce, Ottawa.

Table 48.—World's Monetary Stocks of Gold at the Close of 1934 and 1935

(Subject to Revision)
(Compiled by United States Mint from Available Data)
(Stated in United States Money)

Country	Total Gold Stock Value, 1934 (y)	Per Capita	Total Gold Stock Value, 1935 (y)	Per Capita
	\$	\$	\$	\$
United States*	8,237,967,000	65.38	10,125,175,000	78.07
Canada.....	205,120,000	19.06	189,531,000	17.37
Belgium.....	589,880,000	71.52	585,988,000	70.81
Denmark.....	60,396,000	16.59	53,530,000	14.53
France.....	5,444,828,000	129.95	4,393,308,000	104.75
Germany.....	61,402,000	0.94	62,762,000	0.94
Great Britain.....	1,584,512,000	33.99 (h)	1,648,359,000	35.15
Italy.....	517,803,000	12.26	269,706,000	6.27
Netherlands.....	573,090,000	69.13	437,929,000	51.68
Norway.....	61,113,000	21.38 (e)	83,980,000	29.12
Poland.....	95,579,000	2.89	84,382,000	2.49
Portugal.....	67,568,000	9.53	68,073,000	9.43
Rumania.....	103,879,000	5.53	109,100,000	5.68
Russia (Soviet Union).....	744,030,000	4.43 (a)	.....	..... (b)
Spain.....	740,812,000	30.56 (e)	736,733,000	29.65
Sweden.....	159,616,000	25.69 (e)	185,363,000	29.67
Switzerland.....	623,910,000	150.88 (e)	453,723,000	108.98
British India.....	274,532,000	0.76 (e)	274,526,000	0.75
Japan (including Chosen, Taiwan, Kwantung).....	393,643,000	4.09 (c)	425,376,000	4.34
Netherland East Indies.....	77,249,000	1.22 (e)	57,888,000	0.90
Egypt.....	54,776,000	3.60	54,776,000	3.55
Australia.....	21,546,000	3.24 (f)	4,376,000	0.65
New Zealand.....	24,733,000	16.00	23,091,000	14.81
Union of South Africa.....	192,086,000	22.79 (e)	218,746,000	25.44
Other countries.....	1,076,300,000	.....	1,135,892,000	.....
Total.....	21,986,370,000 (g)	10.91	21,682,313,000 (g)	11.55

(y) 1 ounce fine gold—\$35.

(a) On Jan. 1, 1935.

(b) Indefinite data for Russia.

(c) Gold and silver.

(d) June 30, 1935.

(e) In part held abroad.

(f) Average for quarter ending Dec. 31, 1934, and includes some silver.

(g) World population figures are principally from Statistical Yearbook of the League of Nations, 1934-35-36.

(h) On December 26, 1934, and January 1, 1936.

*Includes Alaska, Hawaii and Porto Rico. Argentina gold stock reported at \$440,409,000 (\$35.54 per capita) in 1935.

NOTE.—It is understood that large amounts of gold are held outside of declared monetary stocks in Great Britain, France and possibly other countries; also that the stocks of the U.S.S.R. are omitted in 1935.

Table 49.—Security Price Index Numbers, 1930-1936

(1926=100)

Month	Canadian Common Stocks						Dominion of Canada Long Term Bond Yields
	(a) Industrials and Utilities			(b) Mines			
	Common Stocks Total	Industrials	Utilities	Mines Total	Gold	Base Metals	
1930							
December.....	103.1	120.3	104.7	59.2	57.8	.....	93.9
1931							
December.....	64.8	74.3	59.3	59.0	59.0	.....	111.7
1932							
December.....	52.2	58.9	45.7	63.1	62.7	.....	99.4
1933							
December.....	75.3	111.4	47.8	105.1	100.4	127.1	95.1
1934							
December.....	86.2	125.6	47.5	124.9	124.7	129.6	71.3
1935							
January.....	88.6	129.7	50.4	124.3	123.2	132.4	70.9
July.....	92.4	143.8	44.7	117.9	110.1	151.9	72.1
December.....	107.4	178.2	50.1	133.6	116.9	201.7	75.5
1936							
January.....	112.9	187.7	52.4	142.4	124.8	214.8	72.4
February.....	120.7	200.0	57.0	149.8	130.2	230.4	70.8
March.....	117.4	194.8	55.5	144.2	122.7	232.2	69.9
April.....	115.9	194.2	53.2	145.8	122.8	241.1	69.5
May.....	112.8	187.9	52.5	150.3	128.9	239.2	68.8
June.....	113.8	189.3	53.3	156.1	134.4	246.0	68.9
July.....	114.3	190.1	53.8	157.6	134.4	254.1	65.1
August.....	114.7	191.4	53.1	158.1	132.6	264.0	63.2
September.....	119.5	200.6	54.8	157.6	131.2	267.1	63.1
October.....	126.9	212.3	59.8	158.2	126.4	289.4	66.2
November.....	131.8	219.9	62.4	167.0	131.8	312.5	65.1
December.....	129.2	212.8	62.8	167.7	131.3	317.8	64.1

Table 50.—Toronto Stock Exchange

(J. Scott Ratray—Statistician)

In the following table is given the aggregate number of outstanding shares of all gold mining companies listed on the Toronto Stock Exchange, together with the total quoted market valuation at the end of each month. Total number of listed gold mining companies is also given and also the total number and valuation of all companies listed.

	Total shares issued	Quoted market value	Number of companies	Total value of all stocks	Total number of companies
		\$		\$	
1937					
June.....	334,574,134	550,037,531	113	5,544,081,545	494
May.....	334,309,014	593,223,079	113	5,746,453,893	492
April.....	340,066,012	629,641,339	115	5,628,812,010	488
March.....	334,309,014	748,424,741	113	6,318,990,438	482
February.....	328,011,335	769,968,157	111	6,422,160,834	471
January.....	321,416,950	784,967,553	108	6,124,012,227	459
1936					
December.....	318,706,459	649,897,133	107	5,911,748,332	456
November.....	323,160,928	745,299,283	108	5,698,862,911	455
October.....	319,224,597	684,681,527	107	5,559,627,068	453
September.....	312,734,856	695,149,066	105	5,343,542,314	449
August.....	305,518,659	710,925,595	103	5,119,409,480	446
July.....	382,146,544	718,920,996	100	5,070,774,341	440
June.....	289,480,554	659,127,288	97	4,918,496,229	433
May.....	280,383,743	668,705,960	95	4,905,923,047	429
April.....	270,937,912	581,682,822	93	4,712,799,705	425
March.....	260,361,073	559,583,988	89	4,895,792,639	418
February.....	258,420,560	574,180,219	89	5,033,416,906	420
January.....	249,420,948	572,841,887	96	4,932,847,066	421

THE ALLUVIAL GOLD MINING INDUSTRY IN CANADA

Placer gold was reported in Canada as early as 1823 when the metal was discovered on the Chaudière river, Quebec. Later, in 1855, alluvial gold was found at the mouth of Pend d'Oreille river, B.C., by the ex-servants of the Hudson's Bay Company and by 1859 placer miners had penetrated to Cariboo and Quesnel. Later years witnessed many important discoveries of placer gold in both British Columbia and the Yukon, the most outstanding of which was the finding of the sensationally rich Klondike deposits in 1896. At the present time the greater part of the Canadian production of alluvial gold comes from the Yukon Territory and British Columbia; smaller amounts are recovered in Alberta, Quebec, and sometimes Nova Scotia.

Nova Scotia.—During 1936 a small quantity of placer gold was recovered by J. Oscar Young. The metal was obtained by panning the beach sands at The Ovens, Lunenburg County, all work being conducted during the summer months.

Quebec.—Two alluvial gold properties were active in Quebec in 1936. At Rivière des Plantes, Beauce Co., surface operations were carried on by Geo. A. Dion. In Ditton Township important prospecting and exploration work was conducted by Embergold Mines Limited in order to outline old channels and examine the undisturbed pre-glacial yellow clays and gravels. The main work was the sinking of a shaft to bed-rock, a depth of 25 feet and the subsequent driving of 600 feet of galleries.

British Columbia.—Alluvial gold production in British Columbia in 1936 totalled 34,711 fine ounces compared with 24,744 fine ounces in 1935. The number of individuals employed in the industry during 1936, as compiled from returns made available, was 524; salaries and wages paid amounted to \$724,510, the corresponding figures for 1935 being 422 and \$547,479 respectively.

Material handled totalled 2,083,934 cubic yards and 108 miles of ditches and flume were utilized for water supply. Types of deposits worked were described as bench gravels, cemented tertiary gravels, old river channels, old tailings, glacial gravels, deep placers, creek and stream gravels, clay boulder gravel and river bars.

Methods employed in the recovery of gold included underground drifting, sluicing, steam shovel excavating, drag line excavating, hydraulicking and dredging. Equipment utilized was varied—smaller operators using shovels, pans and rockers, whereas monitors, power shovels, drag lines or dredges were employed chiefly at the larger properties.

Placer mining operations in 1936 were widespread throughout the various alluvial gold mining areas, particularly in the Artin, Cariboo and Quesnel districts; other districts to report production included Fort Steele, Omineca, Greenwood, Kamloops, Liard and Peace River.

Yukon.—The report of the Controller of the Yukon Territory for the fiscal year ending March 31, 1937, contains, in part, the following particulars relating to placer mining:—"The amount of placer gold mined during the year in the Territory on which royalty export tax was paid was 62,635.75 ounces, produced as follows: Dawson District, 61,342.39 ounces; Mayo District, 799.39 ounces; and Whitehorse District, 493.97 ounces. The royalty collected was \$23,488.53. The gold production showed an increase of 18,071.56 ounces over that of the previous year.

"In the Dawson District forty-eight new placer location grants, fifty-one re-location grants, and two thousand two hundred and twenty renewal grants were issued. Four dredging leases were renewed, covering thirty-one and three-fourths miles. Six hydraulic leases were renewed."

A review in part of operations by the Yukon Consolidated Gold Corp. Ltd. follows: "The hydro-electric power plant on the north fork of the Klondike river generated a total of 22,015,740 K.W.H., an increase of 66 per cent over the preceding year. Eighty-three per cent of the total output was used in connection with placer mining operations, the remaining 17 per cent was sold to the Dawson Utility Company, which supplies the town of Dawson with light, water and telephone service. Eighty thousand, five hundred dollars were expended on additions and repairs to the ditch system which conducts water to the power plant.

"Hydraulic stripping of frozen muck overburden was continued at Arlington, Upper Dominion Creek and Quartz Creek. All the water used in stripping operations is supplied under pressure from pumping plants on the creek channels, using only the natural supply available, except at the Arlington plant which receives water from the Klondike river. A large cold water thawing plant was operated at Granville throughout the season using water from Dominion Creek which was re-circulated by three pumps. Smaller plants were operated at other locations. Seven dredges were in operation and 7,957,108 cubic yards of ground were dredged. Operations were conducted at Upper Dominion Creek, Middle Klondike river, Lower Klondike river, Upper Klondike river, Granville and Quartz. Dredge No. 3, the first to commence operations in 1936, started dredging May 4 and shut down Nov. 25; operations of Dredge 2 on Middle Klondike river extended from May 9 to Dec. 2.

"Plans were made for the construction of a sixteen-mile ditch which will convey water from Australia Creek to a point on the right limit of Sulphur Creek below Discovery. A combination of gravity siphon and pumping plant will be used to cross the lower Dominion Creek valley. The pumping plant will require motors of 1600 H.P. output. Excavation was commenced on this ditch in July and a total of \$56,550 was expended on this work."

The dredge on the Sixty-mile river, operated by the Holbrook Dredging Company, ran intermittently from August 1 to November 11; 54,276 cubic yards of material were handled.

Prospecting for placer gold has continued generally throughout the Territory with very encouraging results. The whole of one old placer creek, namely, Clear Creek, has been optioned by the Fairbanks Exploration Company, with the intention of drilling to prove whether it will make a dredging area.

Aeroplanes are now used in the late winter months to freight summer outfits to miners located on remote creeks.

Table 51.—Summary of Statistics of Alluvial Gold Mining in Canada, 1935 and 1936

	1935			1936		
	British Columbia	Yukon	Quebec and Alberta	British Columbia	Yukon	Nova Scotia, Quebec and Alberta (d)
Number of firms and individual operators†	80	3	(c)	74	3	3
Time in operation—months	6-8	6-8	6-8	6-8	6-8	6-8
Capital employed..... \$	4,725,869	4,472,664	(c)	4,415,737	6,549,787	(c)
Number of employees.....	422	280	(c)	524	325	4
Salaries and wages paid..... \$	547,479	680,492	(c)	724,510	791,907	3,242
Fuel and electricity used..... \$	32,302	38,232	(c)	53,064	57,113	15
Process supplies used..... \$	13,278	7,925	(c)	43,150	14,235	.....
Electricity generated for own use..... K. W. H.	325,000	13,200,810	(c)	1,574,026	18,258,532	.....
Crude gold recovered..... crude ounces	30,929	44,632	197	43,389	62,740	147
Platinum recovered..... crude ounces	39	.....	.....	20	.....	.....
Value of platinum recovered..... \$	780	.....	.....	809	.....	.....
Quantity of material handled..... cu. yds.	1,855,937	5,442,861	(c)	2,083,934	8,067,159	(c)
Length of ditches..... miles	(b) 79	70	(c)	108	73	(c)
Total value of alluvial products (a).....	897,721	1,294,328	5,713	1,250,412	1,806,912	4,234

†In addition to the number shown in the table, there were several other small operators from whom no returns were obtainable.

(a) Value of crude gold in Canadian funds was estimated at \$29 per crude ounce in 1935 and \$28.80 per crude ounce in 1936.

(b) Includes flume.

(c) Information not available.

(d) Recoveries for Alberta represent receipts of crude gold from Alberta at the Royal Canadian Mint, Ottawa.

THE AURIFEROUS QUARTZ MINING INDUSTRY IN CANADA

The great part of the gold of Canada comes from the Canadian Shield, an immense area of precambrian rocks extending from the Labrador Coast westward almost to the mouth of MacKenzie river. The area of the shield is roughly 1,825,000 square miles, almost half of Canada. The deposits of the shield are of two main types, namely, quartz veins, from which most of the gold, up to the present time, has been won, and sulphide deposits which produce a smaller, but increasing proportion. The second great source of gold in Canada has been the Western or Cordilleran section, comprising British Columbia and Yukon Territory; the gold production from this section was largely of placer origin until recent years. The third principal area in which gold deposits occur is the Acadian region of Eastern Canada, the metal occurring principally in Nova Scotia where it has been mined since 1862.

During 1936 reports were received from 607 active auriferous quartz mines as compared with 384 in 1935. The gross value of bullion, ores, concentrates, etc., shipped in 1936 totalled \$108,093,017, against a corresponding value of \$91,714,805 in the preceding year. Employees numbered 25,097 in 1936 and salaries and wages attained an aggregate value of \$39,826,742.

Fuel and electricity consumed at the mines and mills was valued at \$6,077,368 and the cost of explosives, drill steel and other process supplies used totalled \$13,805,416. Dividends paid during 1936, computed from actual returns made by the lode gold mining industry, totalled \$33,825,488.

Nova Scotia.—A distinct increase in gold mining activity was experienced in Nova Scotia during 1936; the number of active operators numbered 35 compared with 24 in 1935, while the number of plants increased from 24 in 1935 to 39 for the year under review. Employees engaged in auriferous quartz mining during 1936 numbered 639 and salaries and wages distributed amounted to \$545,836. Gold recoveries in 1936 totalled 11,960 fine ounces valued in Canadian currency at \$418,959 compared with 9,376 fine ounces at \$329,942 in the preceding year.

New developments completed in the industry in 1936, reported by the Nova Scotia Department of Mines, comprised shaft-sinking, 1,472 feet; cross-cutting and drifting, 15,589 feet; raises and winzes, 1,717 feet; and diamond drilling, 3,364 feet.

The Department also reported that several operations, such as Seal Harbour Gold Mines, Ltd., Guysboro Mines Limited, Consolidated Mining and Smelting Co. Ltd., and Montague Gold Mines Ltd., had been in steady progress since the revival of the gold mining industry in 1933. Underground operations by the above-named companies are quite extensive and the developments are increasing rapidly with reserves of payable grade.

The first step in the use of cyanide in gold milling in Nova Scotia was made in 1936 when Seal Harbour Gold Mines Limited erected a 200-ton cyanide plant.

The following operations have also been working steadily for more than a year: Mineral Industries Limited, at Wine Harbour; Avon Gold Mines, Limited, at Oldham; Waverley Consolidated Gold Mines Limited (formerly Lake Thomas Syndicate), at Waverley; Queens Mines Limited, and Mines Development Corporation, at Mount Uniacke, and Nugold Mining Corporation, at Blockhouse.

Under the mine apprentice project the government re-opened the Lacey Gold Mine at Chester Basin where men will be trained in hard rock mining for at least the next three years. In addition to the regular staff of experienced miners, about 70 men will be in training at one time. This property is fully equipped with electrically operated equipment and a 25 ton ball mill.

The government is also preparing to carry out detailed investigations of the precambrian rocks in Inverness and Victoria counties.—J. P. Messervey, Deputy Chief of Mines, Halifax, N.S.

Quebec.—Gold is now by far the principal item in Quebec's list of mineral products. Except for a very small quantity, it is extracted from western Quebec mines, the first one of which came into production in 1927. During 1936 there were 175 active operators in the lode quartz mining industry, an increase of 69 over the preceding year. The industry provided employment for 4,043 persons and paid \$5,760,422 in salaries and wages.

The following notes on western Quebec mining fields were abstracted from a report by R. H. Taschereau, Inspector of Mines, Quebec.

"In the spring of 1936 a spectacular gold discovery was made at the O'Brien-Cadillac mine. This high-grade shoot was opened up in the 500-625-750-875 and 1,000 foot levels. At about the same time rich ore was struck at the neighbouring Thompson-Cadillac mine. The Bouscadillac, Kewagama and Pandora mines were re-opened. Shaft-sinking was commenced at the Lapa-Cadillac, Central-Cadillac and Pan-Canadian properties.

"In the Bourlamaque-Dubuisson area the Shawkey mine was brought into production in February. At the Siscoe mine, systematic development improved the outlook and substantial additions were made to ore reserves at the Lamaque mine. At the Sigma mine a 300 ton cyanide unit was under construction and improved conditions were noted at the Sullivan and Green-Stabell properties.

"In the Fournière-Malartic field the Canadian-Malartic mine continued production and underground work was actively carried on at the Sladen-Malartic and East-Malartic mines.

"The Perron mine commenced production in February, 1936; at the Stadacona-Rouyn a 200 ton mill was completed and production started in the fall. In Guillet township a 100 ton cyanide plant was erected at the McIntyre-Porcupine property. The Beattie mine treated 1,500 tons a day with research work improving recoveries. Small mills were erected at the O'Neill Thompson, the Mines Development and the Tiblemont Island mines.

"In the fields north of the Quebec-Cochrane line of the C.N.R., a great deal of underground exploration work was carried on at the Lake Rose mines property, Madeline Lake and at the Consolidated Chibougamau Goldfields mine in Chibougamau."

The number of claims staked in Quebec during 1936 reached a record figure of 17,503, representing a total area of about 700,000 acres. The previous peak was attained in 1928 with 13,121 claims. The number of miners' certificates issued in these two years were 5,471 and 3,294 respectively.

Ontario.—The number of active operators in the Ontario auriferous quartz mining industry during 1936 was 215, compared with 116 in 1935. In 1936 this industry employed 15,912 persons and distributed \$26,466,946 in salaries and wages.

Mr. A. C. Young, Director of Publications and Statistics, Ontario Department of Mines, Toronto, supplied the following summary review of the industry in 1936:—

"Mining development was carried on actively in all gold-bearing sections of Ontario. Commencing at the north-east, the old Larder Lake area, discovered first in 1906 and so long quiescent, was suddenly revived by the success attained at the Omega. Work on neighbouring properties was pushed and outstanding among these was the proving of a large ore shoot on the Kerr-Addison by four tunnels driven to the deposit. Plans are being prepared for installation of mine

and mill equipment at the Kerr-Addison with initial capacity of 500 tons and eventual capacity of at least 1,000 tons per day. The Martin-Bird to the south of the lake also continued to develop favourably. These successes intensified the interest along the mineral belt towards Kirkland Lake and old claims, long idle, suddenly became valuable. In this area, stretching over six townships from Grenfell on the west through Teck, Lebel, Gauthier, McVittie, and McGarry on the east, or a distance of almost thirty-six miles, prospecting and mining development were speeded up, giving employment to a large number of men.

"At Porcupine, about forty miles to the west and north of Kirkland, expansion of the same nature was observed, indicating a widening of the favourable mining area. From the Moneta near the Hollinger on the west to the Pamour on the east and the Delnite on the south, operations of all kinds were noted covering the townships of Mountjoy, Tisdale and Whitney, while extensive diamond drilling campaigns were carried out to the east and northeast of the area.

"Active exploration, including considerable diamond drilling, was conducted on auriferous ores occurring in the old Eastern Ontario gold field, however, none of these properties reached the production stage during 1936.

"In Matachewan, while the Ashley closed down permanently, the Matachewan Consolidated and Young-Davidson enlarged their activities. In Timagami the New Golden Rose was proved to have all the characteristics of a gold mine, and at Sudbury, the Bousquet and Gomac both produced gold.

"In the northwestern part of the province, the new find at Uchi Lake near Confederation Lake in Patricia was important, as was the favourable expansion along the strike of the Little Long Lac mine. A staking rush to Rowan Lake south-east of Lake of the Woods caused a large increase in claims recorded in the Kenora and Rainy River areas. The mines of the Lake of the Woods and Rainy River areas were important during the last decade of the nineteenth century. Some thirty-five properties produced gold, and among these, the Mikado and Sultana were each credited with values around half a million dollars. The great majority of these properties, however, never had sufficient work done on them to prove or disprove their value. Many of these old locations are again being opened and examined and modern methods may prove former failures to have futures as gold producers.

"During the period, four mines joined the list of dividend payers, making a total of 24 now declaring dividends. Ten new gold mills started milling operations and three ceased permanently. The total number of producing plants of all sizes in 1936 was 64, of which only 41 might be said to be permanently operating. The total rated capacity of all plants was 24,190 tons per day.

Manitoba.—Gold mines reported as active in Manitoba during 1936 totalled 21, or an increase of 1 over 1935. Employees in the industry in 1936 were reported at 817, and salaries and wages amounted to \$1,389,048. A summary review of the auriferous quartz mining industry in Manitoba, by Geo. E. Cole, Director of Mines, Manitoba, follows:—

"The production of gold in Manitoba during 1936 totalled 139,273 fine ounces compared with 142,613 fine ounces for 1935. While an increase was predicted in the light of new producers being added to the list, the increased production on the part of the Hudson Bay Mining and Smelting Company in the Saskatchewan portion of its Flin Flon mine took away a considerable gold production from Manitoba, but it is, on the other hand, credited to Saskatchewan.

"The year 1936 was marked by the addition of two producers, Gunnar at Beresford Lake, and Laguna at Herb Lake.

"Gunnar Gold Mines Limited, which carried on development work in 1935, commenced production in May, 1936, and at the end of the year had produced gold to the value of \$379,000.

"Another development of interest was the revival of the old Rex mine at Herb Lake. The mine had a small production up to the year 1920. Active exploration was renewed in 1935 and was followed by successful development of ore that warranted the building of a 60-ton mill. Production was commenced on schedule in August, 1936, and by the end of the year gold in excess of \$165,000 was produced.

"While prospecting for precious metals fell off, there was increased activity in the search for base metals."

The Department of Mines and Resources, Ottawa, reported that three belts of favourable rock formations were located in a large area mapped to the east of Lake Winnipeg in Manitoba. Several gold properties are active in that region. Examination of the recently discovered gold deposits in the Echimamish river area enabled the Department to give immediate guidance to prospectors in that active area.

Saskatchewan.—Development and exploration of auriferous quartz ores in Saskatchewan during 1936 were more widespread and intensive than in any preceding year. Returns made available from the more important properties showed the number of employees at 82 and salaries and wages paid at \$124,513.

A summary review of the industry by Mr. E. Swain, Supervisor of Mines, Regina, Sask., follows:—

"As in former years, gold recovered in Saskatchewan during 1936, came almost entirely from the Flin Flon area, adjacent to the Manitoba-Saskatchewan boundary, with the exception of 45.7 ounces recovered from mineral claims in the Lake Athabaska area by Athona Mines Limited.

"While major attention has been focussed on several promising areas in the Lake Athabaska region, which areas take their names from known lakes and rivers, intensive prospecting and valuable discoveries were made in other portions of Northern Saskatchewan in the vicinities of Lac la Ronge, Nistoasseni Lake, and small lakes near the Flin Flon area.

"In addition to the Hudson Bay Mining & Smelting Company operations at Flin Flon, small companies were developing mines which are rapidly heading towards production, such as Monarch Gold Miners Syndicate Limited, who have installed a 50-ton mill on the "Monarch" mineral claim on the west side of Amisk Lake, which is now in operation. A complete mining plant has been assembled and 125 feet of diamond drilling indicates that the vein extends to a depth of 215 feet, and surface sampling and sampling of the shaft indicates about 10,000 tons of ore averaging close to 1 ounce a ton in gold.

"Flin Flon Gold Mines Limited properties three and one-half miles southwest of Flin Flon, have been intensely prospected, 13,000 feet of diamond drilling having been done, the No. 1 vein traced for over 18,000 feet, a shaft sunk to 465 feet, and four levels opened up at 125, 225, 325 and 440 feet, and over 3,400 feet of lateral work.

"Adjoining this property is that of North of 54 Mines Limited, who have completed 1,670 feet of diamond drilling, and removed 20,000 cubic feet of rock.

"Henning-Maloney Gold Mines Limited in developing their property at the south end of Douglas Lake, made a new vein discovery on the "Reo", "Toots" and "Arthur No. 2" mineral claims. Nineteen diamond drilled test holes have proved the extensions of the vein to be over one mile in length. Altogether, 3,031 feet of diamond drilling have been completed.

"At Raft Lake six miles west of Flin Flon, 2,000 feet of diamond drilling have been carried out, and within one mile west of Flin Flon, Schenley Mines Ltd., who acquired Callinan-McKay Exploration Company property, did some surface drilling and diamond drill work, of which no report can be given at the moment.

"A further discovery of gold ore was made at Dog or Sulphide Lake on the north shore of Lac la Ronge. The same is reported as being an auriferous quartz vein 3 to 4 feet wide, intruding a porphyritic mass which also carries small quartz veins, carrying very good gold values and has been traced on the surface a distance of 3,000 feet.

"At Norite Bay seventy miles east of Goldfields, thirty-nine individual discoveries were made in the fall of 1936, many of which have interesting gold showings. The property will, no doubt, be intensely prospected during 1937.

"Twenty-five miles northeast of Goldfields is another discovery of what is reported to be auriferous nickel ore. Further information will be obtained as a result of prospecting work.

"At Lake Athabaska, Consolidated Mining & Smelting Co. of Canada, Limited, in their prospect mine on the "Box" property, have carried out 6,073 feet of underground development, and 11,329 feet of diamond drilling. On other claims in the same district, namely the "Rex" and "Murmac" the Company has done 4,706 feet of diamond drilling and 1,582 feet of diamond drilling, respectively, in addition to surface trenching.

"At Neely Lake sixteen miles north of Goldfields, 137 feet of underground work and 3,843 feet of drilling has been carried out. In addition, the same company did 7,834 feet of diamond drilling on the "Jim" and "Pat" groups of claims at Dinty Lake and Prince Lake, besides surface work.

"North of the "Box" property, Coniagas Company diamond drilled 3,000 feet on the "Mike" mineral claims and intend to carry out a much larger program for 1937.

British Columbia.—The number of auriferous quartz mines operated in British Columbia during 1936 totalled 138 compared with 109 in 1935. Employees in 1936 numbered 3,582 and salaries and wages paid amounted to \$5,508,111. The industry during the year under review expended \$544,240 in fuel and electricity and \$2,097,772 in explosives and other process supplies. The gross value of bullion, ore, etc., shipped from quartz gold mines in 1936 was \$13,264,259 and the net value was estimated at \$10,622,247.

In the Bridge River area, Bralorne Mines Limited reported that the amount of development work carried out during 1936 showed an increase over 1935, chiefly due to the additional work necessary to bring the Bradian property into production; the mill of the company treated 167,264 tons, averaging .411 ounces of gold, or an average of 458 tons daily; the cut-and-fill method is now being used wherever the vein is found unsuitable for the shrinkage system. In January, 1937, a new crushing plant was placed in operation at the Pioneer mine which increased flexibility of operation; percentage recovery for the year ending March 31, 1937, was 96.43 per cent and ore reserves (positive and indicated) at the end of the same period were reported at 597,481 tons, averaging .425 ounce of gold per ton, of which 386,466 tons were positive. Both the mill and mine of Minto Gold Mines Limited were in continuous operation throughout the year; 29,392 tons of ore were mined and 29,271 tons milled; development work at the property included shafts, 206 feet; cross-cuts, 45 feet; drifts, 979 feet; and raises, 553 feet. At the Wayside mine, 2,225 feet of cross-cutting and drifting were completed and 37,535 tons of ore milled; this property was also in continuous operation during the year.

Included among the more important operations in the Cariboo district were those conducted by the Cariboo Gold Quartz Mining Co., Ltd.; mining and milling were continuous and extensive development and exploration programs were completed, including nearly 5,000 feet of diamond drilling. In the same district the property of Island Mountain Mines Co. Limited maintained steady production during the entire year, reporting the mining and milling of 43,649 tons of ore.

Gold mining operations in the Nelson district were numerous and extensive development and exploratory work was conducted at several properties. Some of the more important producers in this part of the province included the Reno, Second Relief, Arlington, Ymir-Consolidated, Ymir Yankee Girl, Wilcox, Sheep Creek and Kootenay Belle.

In the Similkameen district the Kelowna Exploration Co. Ltd., operated the Nickel Plate mine and mill throughout the year; 64,854 tons of ore were milled and concentrates produced were exported for treatment in foreign smelters. At the Hedley Mascot, 30,265 tons of ore were mined and 2,786 tons of concentrates exported. At Oliver the Fairview and Morning Star mines were operated by the Fairview Amalgamated Gold Mines Limited; 12,960 tons of ore were milled and 233 tons of concentrates exported.

Among the more outstanding gold mining operations carried on in the northern coast districts were those of the Silbak-Premier, Surf Point and Surf Inlet properties. At the Surf Point mine 15,215 tons were raised and 478 tons of concentrates produced; both the mine and mill were operated throughout the year.

Development and exploration in the Premier mine during 1936 aggregated 7,807 feet of drifting and cross-cutting and 4,833 feet of diamond drilling; there were mined and milled 185,884 tons of ore from the Premier mine, assaying 0.23 ounces of gold and 6.38 ounces of silver per ton from which 14,902 tons of concentrates were produced; ore reserves broken and unbroken, in the Premier mine are estimated by that company as of December 31, 1936, at 84,347 tons assaying 0.24 ounces of gold and 5.53 ounces of silver. Developments and exploration in the B.C. Silver and Sebakive mines were represented by 23,100 feet of diamond drilling and 4,457 feet of drifting, etc.; major developments consisted of advancing Premier's fifth level in B.C. Silver ground and extending the 1,350 level through to the Sebakive shaft; unbroken ore reserves in the B.C. Silver and Sebakive mines as of December 31, 1936, are reported at 147,006 tons, averaging 0.28 ounce

gold and 6.88 ounces silver per ton. At the Big Missouri mine development work in preparation for ore extraction from the 326 ore body was continued and the company (Buena Vista) decided to proceed with the installation of a 500-750 ton mill; owing to the unusually heavy snowfall, it was decided to place the mill underground with storage bins below the 2,300 level.

In addition to the properties referred to, there were many other lode gold mining operations conducted that were too numerous to review completely in a summary report of this nature.

Yukon.—The Controller of the Yukon supplied the following information relating to lode mining in the Yukon during the fiscal year ending March 31, 1937:—

"Sixty-four quartz grants were issued in the Dawson district during the year. Four hundred and six claims were renewed.

"The Yukon Consolidated Gold Corporation Limited abandoned their option on the La Forma group of claims on Mt. Free Gold, and no further work has been done on this property.

"An option has been taken on the Broun-Fairclough group on Mt. Free Gold by a new company called the Mount Free Gold Yukon Mines Ltd. A provision in the option is one providing for the installation of a ten-ton mill on the property by May 1, 1937. Considerable interest is shown in this district; very few claims have been allowed to lapse, and much exploratory work has been done by individual claim owners."

At the Keno Assay Office, maintained by the Territorial Government, 1,316 samples of rock for assay were received from all parts of the Territory, and 2,098 assays or quantitative analyses were made.

Northwest Territories.—Development and exploration of auriferous quartz deposits in the Northwest Territories during 1936 were largely restricted to the Great Slave Lake district and more particularly to the Yellow Knife River area and Outpost Island. No production was reported in 1936 for properties operated in this district. On Outpost Island 200 feet of shaft sinking, 87 feet of cross-cutting and 2,599 feet of diamond drilling were completed by the Slave Lake Gold Mines Ltd. Included among the more important exploratory and development programs conducted in the Yellow Knife area were those of the Burwash Yellowknife Mines Ltd., and the Vicmac Syndicate Limited.

Table 52.—Ores Mined and Milled, Crude Bullion Recovered and Crude Bullion and Concentrates Shipped in the Auriferous Quartz Mining Industry, 1936

(Ton—2,000 pounds)

	Nova Scotia	Quebec	Ontario	Manitoba	Saskat- chewan	British Columbia and North- west Ter- ritories	Canada
1936							
Number of producing mines.....	30	17	69	6	1	78	201
Ore mined..... tons	84,692	1,450,027	7,773,332	253,558	5,115	1,127,484	10,694,208
Ore milled..... tons	71,737	1,391,686	7,731,065	248,663	916	1,060,114	10,504,181
Tailings retreated..... tons		10,404	2,543			20,867	33,814
Concentrates produced..... tons	355	29,956	1,379			43,095	74,785
Gold content of ores and concen- trates shipped..... fine oz.	175	21,226	10,416			170,610	202,427
Bullion recovered by amalgam- ation..... crude ounces	11,974	100,080	265,245	35,051	50	107,054	519,454
Bullion recovered by cyanid- ation..... crude ounces		310,047	2,770,125	80,846		180,549	3,341,567
Bullion shipped..... crude ounces	12,009	408,658	3,020,817	116,091	50	277,330	3,834,955
Content of bullion shipped—							
Gold..... fine oz.	10,717	302,350	2,292,479	75,355	46	211,553	2,893,000
Silver..... fine oz.	318	55,295	471,487	10,937	10	51,074	589,121
Value..... \$	221,494	6,284,792	47,597,684	1,562,636	956	4,394,726	60,062,288
Exchange premium on bullion..... \$	153,059	4,346,778	32,914,603	1,081,438	660	3,035,033	41,531,571
Value of ores, slags and residues sold..... \$	6,125	353,148	305,385			5,834,500	6,499,158
Total value of all shipments (a). \$	380,678	10,984,718	80,817,672	2,644,074	1,616	13,264,259	108,093,017
Value of fuel, electricity and pro- cess supplies used..... \$	274,235	3,005,180	13,152,334	724,022	-74,101	2,652,912	19,882,784
Net value of shipments..... \$	106,443	7,979,538	67,665,338	1,920,052	-72,485	10,611,347	88,210,233

(a) Less freight and treatment charges.

Table 53.—Ores, Concentrates and Slags Shipped from the Auriferous Quartz Mines in Canada, 1936

Item	Nova Scotia, Quebec, Ontario and Manitoba mines shipping		British Columbia mines shipping		Canada
	To Canadian smelters	To Foreign smelters	To Canadian smelters	To Foreign smelters	
Number of mines.....	17	7	37	40	101
Tons of ore, etc., shipped.....	369	31,311	12,265	36,238	80,183
Metal content—					
Gold.....oz.	3,817	28,000	41,013	129,597	202,427
Silver.....oz.	7,792	9,264	160,092	1,162,585	1,339,733
Copper.....lb.	327	204,622		549,027	753,976
Lead.....lb.			1,705,945	740,429	2,446,374
Zinc.....lb.					
Arsenic.....lb.					
Value*.....\$	128,062	536,596	1,283,017	4,551,483	6,499,158

* Value f.o.b. cars at mine, less freight and treatment charges only.

Table 54.—Gold Content of Bullion, Ores, Concentrates, etc., Shipped, and Ore Milled by the Auriferous Quartz Mining Industry in Canada, with Average Price of Gold in Canadian Funds, 1929-1936

Year	Tonnage treated	Gold content fine ounces	Ounces of fine gold per ton	Average price of gold
1929.....	4,371,143	1,771,526	.41	\$ 20.67
1930.....	4,429,906	1,884,791	.43	20.67
1931.....	5,526,379	2,271,278	.41	21.55
1932.....	5,997,492	2,502,327	.42	23.47
1933.....	6,480,164	2,455,365	.38	28.60
1934.....	7,524,803	2,490,513	.33	34.50
1935.....	8,907,610	2,645,659	.30	35.19
1936.....	10,510,750	3,095,427	.29	35.03

Table 55.—Specified Costs per Ton of Ore Milled at Certain of the Principal Auriferous Quartz Mines in Canada, 1936

Name of mine	Develop- ment and explora- tion	Mining	Milling	Other	Total cost per ton
Teck Hughes (l).....	\$ 0.45	\$ 2.75	\$ 1.06	\$ 0.80	\$ 5.06
Sylvanite (a).....	1.810	2.040	1.022	0.877	5.749
Lake Shore (h).....	0.457	3.409	1.194 (i)	1.792	7.852
Hollinger.....	(x)	3.399	0.677	0.565	4.641
Dome.....	(e) 1.48	1.43	(x)	(x)	4.48
McIntyre (a).....	0.608	3.171	0.731	0.158	4.668
Howey.....	0.013	0.807	0.493 (g)	0.677	1.990
Pickle Crow.....	2.30	3.02	1.72	1.26 (c)	8.30
Siscoe.....	1.043	1.028	1.058 (m)	1.651	4.780
Lamaque.....	2.60	2.29	0.82 (j)	2.64	8.35
Beattie.....	0.499	0.525	0.855	1.509 (b)	3.388
Arntfield.....	1.29	1.759	0.864 (m)	1.028	4.941
San Antonio.....	1.05	(x)	(x)	(x)	4.71
Pioneer.....	1.593	2.440	1.080 (m)	2.666	7.779
Canadian Malartic.....	1.43	1.05	0.86	0.63 (d)	3.97
Little Long Lac.....	1.871	2.436	1.810	1.132	7.249
Paymaster (k).....	1.38	2.45 (k)	1.12	0.38	5.33
Buffalo-Ankerite.....	0.645	2.279	0.844	0.415	4.182
Minto (B.C.).....		2.465	2.110 (m)	2.873	7.448
Surf Point.....	0.392	1.767	1.451 (m)	1.242	4.852
Ymir Yankee Girl.....	1.046	3.135	1.699 (m)	0.808	6.688
Bralorne.....	1.377	2.735	0.676 (m)	2.871	7.659

(x) Data not shown separately. (a) Fiscal year ending March 31, 1937.

(b) Cost per ton milled, including marketing, taxation and depreciation.

(c) Cost per ton hoisted, including shipping and marketing. (d) Reduced to \$3.15 in December.

(e) Includes 57 cents for major development on 16th level. (f) Outside exploration.

(g) Includes depreciation and taxation. (h) Fiscal year ending June 30, 1936.

(i) Includes depreciation and provision for taxes. (j) Includes depreciation.

(k) Year ending June 30, 1936—milling includes sorting and crushing.

(l) Year ending Aug. 31, 1936. (m) Includes taxation, but not depreciation.

NOTE.—The particulars relating to costs have been compiled from annual printed or other reports received from the various mining companies and the total costs per ton should not be interpreted as being generally comparable as depreciation and certain charges including those for predevelopment, exploration, marketing, taxation, etc., are often treated differently and may or may not be included in the total.

Table 56.—Certain Data Relating to the Production of Gold by the Entire Auriferous Quartz Mining Industry in Canada, 1927-1936

Year	Ounces of gold produced per wage-earner year	Cost of fuel and electricity per ounce of gold produced	Cost of wages per ounce of gold produced	Cost of explosives and other process supplies used per ounce of gold produced	Total of specified costs
	ounces	\$	\$	\$	\$
1927.....	234	1.26	6.53	Information	.....
1928.....	206	1.47	7.45	not	.....
1929.....	218	1.46	7.18	available	.....
1930.....	237	1.25	6.63	1927	.....
1931 (a).....	250	1.19	6.50	to	.....
1932.....	255	1.21	6.31	1934	.....
1933 (b).....	207	1.36	7.45	.....	.....
1934 (c).....	154	1.71	9.64	.....	.....
1935.....	146	1.89	10.48	4.38	16.75
1936.....	137	1.98	11.32	4.46	17.76

(a) Equalization exchange premiums paid by the Dominion Government to gold miners (Great Britain goes off gold standard).

(b) United States goes off gold standard.

(c) United States gold dollar reduced in weight from 25.8 to 15.5 '21 grains, 0.9 fine.

NOTE.—The data contained in the foregoing table have been compiled from reports received from both producing and non-producing (exploring and developing) operators in the auriferous quartz mining industry. This fact should be noted if the information is to be construed or employed as possible criteria for technological or other statistical study. The trends revealed are not to be interpreted as reflecting "cause and effect" in the operation of producing mines only but rather as indices of change in the industry as a whole.

Table 57.—Capital Employed in the Auriferous Quartz Mining Industry in Canada, 1936

Province	Mines		Capital employed as represented by:					Total
			Present cash value of the land (excluding minerals)	Present value of buildings, machinery, tools, equipment, etc.	Inventory value of materials on hand, ore in process, fuels, etc.	Inventory value of finished products on hand	Operating capital (cash bills and accounts receivable, prepaid expenses, etc.)	
	Operating	Producing	\$	\$	\$	\$	\$	\$
Nova Scotia.....	35	30	900,759	945,378	51,275	8,775	60,265	1,966,452
Quebec.....	175	17	25,343,141	9,532,629	1,997,425	1,175,012	8,088,036	46,136,243
Ontario.....	215	69	57,531,108	68,560,630	5,220,468	1,603,494	42,703,352	175,619,052
Manitoba.....	21	6	4,617,125	2,860,955	518,391	112,736	852,256	8,961,463
Saskatchewan.....	4	1	.....	134,626	32,112	.....	42,706	209,444
British Columbia.....	128	78	11,476,203	7,168,776	861,637	470,552	2,984,787	22,961,955
Northwest Territories.....	2	.....	50,000	52,000	23,500	.....	38,469	163,969
Total.....	580	201	99,918,336	89,254,994	8,704,808	3,370,569	54,769,871	256,018,578

Table 58.—Employees, Salaries and Wages in the Auriferous Quartz Mining Industry in Canada, by Provinces, 1936

Province	Number of employees					Salaries and wages
	On salary	Wage-earners			Total employees	
		Surface	Under-ground	Mill		
						\$
Nova Scotia.....	66	268	268	37	639	545,836
Quebec.....	632	1,647	1,533	231	4,043	5,760,422
Ontario.....	1,250	4,478	9,137	1,047	15,912	26,466,946
Manitoba.....	93	304	374	46	817	1,389,048
Saskatchewan.....	23	35	22	2	82	124,513
British Columbia.....	368	1,076	1,790	348	3,582	5,508,111
Northwest Territories.....	3	15	4	.....	22	31,866
Canada.....	2,435	7,823	13,125	1,711	25,097	39,826,742

Table 59.—Wage-Earners, by Months, in the Auriferous Quartz Mining Industry, 1933-1936

Month	1933	1934	1935	1936
January.....	10,764	13,329	16,356	18,895
February.....	10,815	13,540	16,342	19,074
March.....	10,808	13,897	16,737	19,397
April.....	10,918	14,516	17,207	20,060
May.....	11,229	15,556	17,656	21,034
June.....	11,836	16,404	18,281	22,750
July.....	12,331	17,145	18,784	23,599
August.....	12,754	17,734	19,372	24,643
September.....	12,636	18,187	19,270	25,624
October.....	13,060	18,342	19,770	26,628
November.....	12,841	17,712	19,292	25,910
December.....	12,443	16,938	18,645	24,899

The Copper-Gold-Silver Mining Industry, 1936

The mining of copper-gold-silver ores in Canada during 1936 was confined to the provinces of Quebec, Manitoba, Saskatchewan and British Columbia. It is to be noted that in addition to the copper recovered from ores of this type there is a very large and increasing quantity of the metal obtained in the smelting and refining of the copper-nickel ores mined in the Sudbury area of Ontario; increasing quantities of gold and silver are also being extracted from these copper-nickel ores.

During 1936 there were 26 firms reported as active in the copper-gold-silver mining industry. The gross value of crude ore, concentrates, etc., shipped from the mines and mills to smelters was estimated at \$19,271,965; the cost of fuel, electricity and process supplies consumed totalled \$3,652,068; based on these figures the net value of shipments was computed at \$15,619,897.

The number of employees engaged in the industry in 1936 totalled 3,738 and salaries and wages paid amounted to \$5,473,325; the corresponding figures for the preceding year were 3,430 and \$5,040,196 respectively.

The foregoing statistics refer only to mines and mills and are not inclusive of data pertaining to smelters and refineries, particulars for which are compiled and recorded under the non-ferrous smelting and refining industry.

Quebec.—At Eustis, in the Eastern townships, the Consolidated Copper and Sulphur Company, Canada's oldest copper producer, conducted continuous mining and milling operations throughout 1936; production of this company consists of argentiferous copper concentrates and iron pyrites concentrates (sulphur ore).

The tonnage and average grade of ore delivered from the Horne mine to the Noranda smelter and concentrator in 1936 were as follows:—

	Tons	Copper	Gold per ton	Silver per ton
		per cent	ounces	ounces
Direct smelting ore.....	483,895	2.82	0.370	0.46
Concentrating sulphide ore.....	1,072,397	1.87	0.137	0.34
Siliceous fluxing ore.....	455,438	0.46	0.123	0.17

During 1936 the Noranda smelter treated 1,120,455 tons of ore, concentrate and refinery slag, and produced 65,376,337 pounds of anodes. The Noranda concentrator milled 1,070,597 tons of Horne mine ore and the cyanide mill treated 149,700 tons of pyrite from the flotation plant tailing, from which 10,016 ounces of gold were recovered. Total production for the company during the year comprised copper (fine), 62,750,342 pounds; gold, 342,495 ounces, and silver, 543,250 ounces. From information obtained in diamond drilling and other openings in various ore bodies, there is now indicated in the Horne mine above the 2,975 foot level, as of January 1, 1937, the following tonnage of ore:—

	Tons	Copper per cent	Ounces of Gold per ton
Sulphide ore, over 4 per cent copper.....	7,817,000	7.33	0.168
Sulphide ore, under 4 per cent copper.....	19,530,000	0.97	0.189
Siliceous fluxing ore.....	3,032,000	0.88	0.133

In February, 1937, the Normetal Mining Corp. Limited, announced that steps were to be taken immediately to re-open its mine and re-design and complete the mill. Opemiska Copper Mines Ltd. extended its mine shaft to the 550 foot horizon early in 1937 and a station was cut on the 525 foot level; 400 feet of cross-cutting had been completed on this level as well as 600 feet of drifting on or parallel to veins No. I and No. II; considerable diamond drilling was also completed from both the surface and underground workings.

In June, 1936, the Aldermac Mine recommenced operations and work was continuous on the surface and underground throughout the remainder of the year; shipments by this Company were resumed during the first six months of 1937. Other important copper-gold-silver mining operations conducted in northwestern Quebec during the year included those of O'Leary Malartic Mines Ltd., Powell Rouyn Gold Mines Limited, and Fleming Mines Limited, while in March, 1937, it was announced that operations by the Waite Amulet Mines Limited had been resumed.

Manitoba and Saskatchewan.—The most important producer of copper-gold-silver ores in Central Canada is the Hudson Bay Mining and Smelting Co. Ltd.; the Flin Flon mine and smelter of this company are located on the interprovincial boundary between Saskatchewan and Manitoba and production, according to origin of ore, is credited to both provinces. During 1936 the company mined from both open pit and underground a total of 1,656,578 tons of ore, of which 1,637,060 tons, averaging, per ton, copper, 1.66 per cent; zinc, 4.5 per cent; gold .092 ounces; silver, 1.33 ounces, were milled and 16,702 tons, averaging, per ton, copper, 2.87 per cent; gold, .092 ounces, silver, 1.10 ounces, were smelted direct. From this tonnage treated and from 135 tons of purchased custom ore there were produced 44,484,708 pounds of copper, 64,437,820 pounds of zinc, 113,384 ounces of gold, 1,423,977 ounces of silver, 259,833 pounds of cadmium, 73,235 pounds of selenium and 9,527 pounds of tellurium.

Construction expenditures by the Hudson Bay Mining and Smelting Co. Limited, amounted to \$778,651 in 1936, the greater part of which was for the new 19,000 horsepower generating unit at the company's Island Falls hydro-electric plant and in connection therewith additions to the central substation at Flin Flon.

Development work in the mine continued to be extensive and the percentage of ore derived from underground operations was gradually increased until at the end of 1936 it was approximately 66 per cent of the total ore produced. A total of 216,275 tons of waste filling was placed in stopes during the year.

The Sherritt-Gordon mine in Manitoba was unable to take advantage of the increase in copper prices during the latter part of 1936 owing to its not being able to obtain the high electric power required for operations. Power has previously been furnished from the Island Falls plant of the Hudson Bay Mining and Smelting Company, but with increased power consumption at Flin Flon, the Sherritt-Gordon had to await the additions being made to the generating plant at Island Falls.

As power would not be available until July, 1937, the Sherritt-Gordon carried on operations with a small force. Underground work was done at the Main (No. 3) shaft, first in deepening the shaft to a depth of 1,127 feet and cutting stations for 6th and 7th levels at inclined depths of 950 feet and 1,100 feet, respectively. The underground crusher was moved from the 3rd to the 6th level. Heretofore there was no production from the East (No. 1) shaft but advantage was taken of the time to construct an aerial tramway between this shaft and the mill at No. 3, length about two miles. With mining at the East shaft the company will produce both copper and zinc concentrates.

British Columbia.—The only operations conducted in 1936 by the Granby Consolidated Mining, Smelting and Power Co. Limited at Anyox were of a final clean-up nature and resulted in a shipment of some 5,000 tons of material to the Tacoma smelter. According to the "Miner,"

Vancouver, the operation of the 3,000 ton concentrator at Allenby, B.C., was resumed by the Granby Company on June 9, 1937, ending a period of idleness which prevailed from 1930; since March, 1937, the company has expended over \$1,000,000 in rehabilitating the mill and the Copper Mountain mine, twelve miles distant, and in constructing a 7,500 kilowatt steam turbine power plant at Princeton and developing a colliery nearby to supply its coal requirements. The former investment, states the "Miner," was between \$3,000,000 and \$4,000,000. Six hundred men were employed by the company during June, 1937.

At Britannia Beach, both the mine and mill of the Britannia Mining and Smelting Company Limited were in continuous operation throughout 1936. Shipments of zinc ore, copper concentrates and pyrites (sulphur ore) were made by this company which reported that the output from the Britannia mine was steadily increased from early in the summer and that the property was operating at approximately 80 per cent of tonnage capacity as compared with 25 per cent at the end of 1935; a comprehensive development campaign has been planned to be aggressively prosecuted in 1937.

Consolidated Mining and Smelting Company of Canada Limited reported that the leasing of the old workings on the upper levels of its Rossland mines was continued under restrictions made effective in 1936 and resulted in the shipment of 9,330 tons of ore to Tadanac.

Table 60.—Capital Employed in the Copper-Gold-Silver Mining Industry in Canada, 1936

CAPITAL EMPLOYED, as represented by:	
(a) Present cash value of the land (excluding minerals)	\$ 8,705,802
(b) Present value of buildings, fixtures, machinery, tools and other equipment	16,656,500
(c) Inventory value of materials on hand, ore in process, fuel and miscellaneous supplies on hand	1,917,665
(d) Inventory value of finished products on hand	2,712,733
(e) Operating capital (cash, bills and accounts receivable, prepaid expenses, etc.)	10,740,017
Total	\$ 40,732,717
Number of operating mines	27
Number of producing mines	14

Table 61.—Employees, Salaries and Wages in the Copper-Gold-Silver Mining Industry in Canada, 1936

	Number	Salaries and wages
		\$
SALARIED EMPLOYEES—		
Total	326	745,467
WAGE-EARNERS—		
Surface	1,323	4,727,858
Underground	1,735	
Mill	354	
Total	3,412	4,727,858
Grand Total	3,738	5,473,325

Table 62.—Wage-Earners by Months in the Copper-Gold-Silver Mining Industry, 1933-1936

Month	1933	1934	1935	1936
January	2,657	2,813	3,238	3,136
February	2,298	2,827	3,327	3,083
March	2,398	2,817	3,323	3,143
April	2,565	2,856	3,318	3,220
May	2,651	2,958	3,408	3,313
June	2,678	2,928	3,456	3,446
July	2,726	2,985	3,310	3,523
August	2,867	3,104	2,947	3,566
September	2,826	3,122	2,938	3,582
October	2,878	3,088	3,004	3,587
November	2,807	3,147	3,023	3,685
December	2,798	2,930	3,033	3,668

Table 63.—Shipments from Copper-Gold-Silver Mines of Canada, 1936

	Quantity	Value	Total metal content as determined by settlement assay				
			Gold	Silver	Copper	Sulphur	Zinc
	tons	\$	fine oz.	fine oz.	pounds	tons	pounds
12 mines shipped to Canadian plants (b)—							
Ores.....	965,370	3,824,109	247,293	354,006	32,678,904		
†Copper concentrates.....	458,131	11,049,268	228,766	1,718,239	85,761,968		(a)27,715,850
Zinc concentrates.....	100,615	2,021,355	6,017	176,085	1,465,980		91,008,760
Iron pyrites concentrates.....	35,435	119,564				17,796	
3 mines shipped to foreign plants—							
Ores.....	645	10,748					727,398
(c) Copper concentrates.....	63,118	1,986,855	13,208	107,537	23,964,294		
Zinc concentrates.....							
Iron pyrites concentrates.....	91,777	260,066				45,374	
Total.....	1,715,091	19,271,965	495,284	2,355,867	143,871,146	63,170	119,452,008
Value of process supplies, etc.....		3,652,068					
Net Value.....		15,619,897					

†Includes some cyanide precipitate.

(a) Not recovered.

(b) Includes 7 mines operated in the Rossland area by leasers.

(c) Includes some copper precipitate and clean-up material.

Table 64.—Ore Mined and Milled in the Copper-Gold-Silver Mining Industry, in Canada, 1936

	Quebec, Manitoba, and Sask- atchewan	British Columbia	Canada
	tons	tons	tons
Ore mined.....	3,740,387	1,311,835	5,052,222
Ore milled.....	2,779,735	1,311,835	4,091,570
Copper concentrates produced.....	464,939	38,711	503,650
Copper precipitates produced.....		750	750
Pyrite concentrates produced.....	42,797	62,872	105,669
Zinc concentrates produced.....	100,658	645	101,303

NOTE.—In addition some cyanide precipitate is produced in the recovery of gold from copper-gold ores.

CHAPTER THREE

THE SILVER MINING INDUSTRY IN CANADA

Including the Silver-Cobalt Mining Industry, the Silver-Lead-Zinc Mining Industry, and Commodity Statistics Tables on Arsenic, Cobalt, Silver, Lead and Zinc.

1. General Review.
2. The Silver-Cobalt Mining Industry.
3. The Silver-Lead-Zinc Mining Industry.
4. Commodity Statistics—including tables showing production by provinces, imports, exports, prices, and world output of Arsenic, Cobalt, Silver, Lead and Zinc.

Definition of the Industry.—Silver mining in Canada is not a distinct mining industry in as much as silver or silver-bearing minerals usually occur in association with other metals of economic value; with lead and zinc; with cobalt, nickel and arsenic; with lode and placer free gold; in copper-gold and nickel-copper ores, and at Great Bear lake, N.W.T., with uranium and radium. Silver-lead-zinc mining is a very important industry in British Columbia and, to a lesser extent, in the Yukon Territory. Some years ago the mining of silver-lead-zinc ores in Eastern Canada attained a position of considerable importance in the provinces of Ontario, Quebec and Nova Scotia and it is gratifying to record a renewal during 1935 and 1936 in the mining of these ores in the two provinces last referred to. It is to be noted that in addition to its recovery from silver-lead-zinc ores, zinc is now produced in large quantities from the copper-gold-silver ores of the Flin Flon mine located in the Manitoba-Saskatchewan boundary. Zinc concentrates are also produced in British Columbia from copper-gold-silver ores by the Britannia Mining and Smelting Co., Ltd.; the metal also occurs in commercial quantities with copper-gold-silver ores in Quebec.

The silver-cobalt deposits of northern Ontario possess certain characteristics that are radically different from those deposits containing the common commercial lead-zinc bearing minerals; for this reason, and for statistical purposes, silver mining has been divided into two broad divisions—"The Silver-Cobalt Mining Industry" and "The Silver-Lead-Zinc Mining Industry".

1. Production of Silver, Lead, Zinc, Cadmium, Cobalt and Arsenic

The increase during 1936 in metal production, by the mines comprising the silver-cobalt and silver-lead-zinc mining industries, was pronounced. The quantity of cobalt produced was the largest since 1929 and silver production at 18,334,487 fine ounces represents an increase of 10.3 per cent over 1935, however, the sharp fall in the average annual price for this precious metal resulted in a 23.2 per cent decrease in the total value of output. Lead production totalled 383,180,909 pounds, an all time high record, but the value at \$14,993,869 was exceeded annually from 1925 to 1929, inclusive. The output of zinc in 1936 amounted to 333,182,736 pounds and as with lead was the greatest ever recorded in the Dominion; the value of this production was estimated at \$11,045,007, being surpassed only by that of 1926 when production was evaluated at \$11,110,413. Cadmium is recovered in Canada from both silver-lead-zinc and copper-gold-silver-zinc ores and its production during 1936 totalled 785,916 pounds valued at \$699,465, the largest in both quantity and value ever attained for Canadian plants. Production of arsenic in Canada during 1936 was derived entirely from cobalt-silver ores and totalled 1,365,606 pounds as compared with 2,558,789 pounds in the preceding year.

A survey of world production of silver, lead and zinc, based on preliminary data, revealed a distinct expansion in the output of each during 1936. World production of these metals as compared with 1935 showed approximate increases of 17 per cent for silver, 5 per cent for lead, and 12 per cent for zinc. During 1936 Canada, as a mine producer of these metals, ranked third in production of zinc and fourth in the production of lead and silver.

After June 30, 1937, the practice of the London Metal Exchange of issuing two official quotations on both lead and zinc (spelter) was discontinued and instead four quotations for each metal are now being issued on each trading day, as follows:—

1. For shipment in the current month: buyers.
2. For shipment in the current month: sellers.
3. For shipment in the third following month: buyers.
4. For shipment in the third following month: sellers.

It is laid down by the London Metal Exchange that the equivalent of any one price quoted at present shall be the average of the new buyers' and sellers' prices, and, accordingly, the monthly average of the mean daily quotations will be calculated on the four daily quotations instead of two as previously.

2. The Silver-Cobalt Mining Industry

Silver-cobalt ores were discovered in Northern Ontario in 1903 during the construction of the Temiskaming and Northern Ontario Railway. The first property came into production the following year and shipments of these ores have been continuous since that time. Silver production from this source reached a peak in 1911 when 31,507,791 fine ounces were recorded as being contained in shipments. Depletion and exhaustion of ore reserves during the past two decades have resulted in an almost steady decline in the production of metals from these ores. Shipments of cobalt, silver and arsenic from the Cobalt, Gowganda, South Lorrain and other silver-cobalt camps from 1904 to 1936, inclusive, as compiled by the Ontario Department of Mines, were as follows—cobalt, 16,074 tons; silver, 429,009,350 fine ounces, and arsenic, 71,494 tons. Relatively lesser quantities of bismuth, copper, lead and nickel were also recovered as by-products.

Returns reporting shipments of cobalt-silver or cobalt ores during 1936 were received from the following mines—La Rose Rouyn, Temiskaming, Coniagas, McKinley-Darragh, Foster, O'Brien, Kerr Lake, Bailey, Rochester, Silver Bar, Crown Reserve, Beaver, Comet, Colonial, Nipissing, Agaunico, Cobnor, Yorkshire, Cobalt, and Hudson Bay, all located in the Cobalt area. Other properties reporting shipments included the Miller Lake O'Brien at Gowganda, Oliver and Cameron at Elk Lake, and the Frontier and Bellorain in South Lorrain.

In most instances operations were conducted by lessees and shipments ranged from one to several thousand tons. An increased demand for cobalt and nickel-bearing ores has encouraged a renewal of interest in these older camps during recent months.

In 1936 the silver-cobalt mining industry provided employment for 363 persons and distributed \$458,546 in salaries and wages. Fuel and purchased electricity consumed totalled \$104,372 and the value of explosives, drill steel, etc., consumed amounted to \$77,220. The net value of all products was estimated at \$915,376 as compared with \$2,070,716 in 1935, a decrease in value which strongly reflected the fall in silver prices experienced in 1936.

The decline in the mining of silver-cobalt ores in Canada is particularly reflected in the employment figures recorded during the past fifteen years. In 1921 wage-earners and salaried employees reported by the industry totalled 1,224 and salaries and wages disbursed amounted to \$1,739,706, whereas the corresponding totals for 1936 were 363 employees and \$458,546 for salaries and wages, a percentage decrease of 70.3 and 73.7, respectively.

Table 65.—Statistics of the Silver-Cobalt Mines and Mill Operations in Canada, 1936

	1936
Number of mines in operation (*).....	25
Ore mined..... tons	59,592
Ore treated (b)..... tons	62,087
Tailings treated..... tons	421
Concentrates produced..... tons	1,556
Bullion recovered..... fine oz. (a)	12,647
Bullion sold or shipped (exported)..... fine oz.	—
Gross value of bullion, ore, concentrates and residues sold..... \$	1,096,968
Cost of fuel and purchased electricity used..... \$	104,372
Cost of process supplies used..... \$	77,220
Net value of sales..... \$	915,376

(*) All mines located in Northern Ontario.

(a) From direct smelting of nuggets, etc.

(b) Does not include crude ores shipped direct to smelters.

Table 66.—Capital Employed in the Silver-Cobalt Mining Industry in Canada, 1936

	\$
Capital employed as represented by:—	
(a) Present cash value of the land (excluding minerals).....	2,884,180
(b) Present value of buildings, fixtures, machinery, tools and other equipment.....	257,224
(c) Inventory value of materials on hand, ore in process, fuel and miscellaneous supplies on hand.....	127,809
(d) Inventory value of finished products on hand.....	300
(e) Operating capital (cash, bills and accounts receivable, prepaid expenses, etc.).....	2,677,189
Total	5,946,702

Table 67.—Employees, Salaries and Wages in the Silver-Cobalt Mining Industry in Canada, 1936

	1936	
	Number	Salaries and wages
		\$
SALARIED EMPLOYEES—		
Total	38	67,268
WAGE-EARNERS—		
Surface.....	116	391,278
Underground.....	165	
Mill.....	44	
Total	325	
Grand Total	363	458,546

Table 68.—Number of Wage-Earners on Payroll or Time Record on the 15th of Each Month or Nearest Representative Date in the Silver-Cobalt Mining Industry, 1936

Month	1936		
	Mine		Mill
	Surface	Under-ground	
January.....	89	168	46
February.....	85	161	34
March.....	74	160	36
April.....	88	146	38
May.....	122	143	45
June.....	124	139	53
July.....	132	150	53
August.....	137	161	55
September.....	142	171	52
October.....	141	181	50
November.....	124	198	35
December.....	100	177	34

3. The Silver-Lead-Zinc Mining Industry

Silver-lead-zinc ores were mined during 1936 in the provinces of Nova Scotia, Quebec and British Columbia, also in the Yukon Territory. Zinc or lead-bearing ores have also been mined in Ontario at Galetta, near Sudbury, in the Lake Superior district, and in Frontenac and Hastings counties. Silver-pitchblende ores are now being shipped from the Great Bear Lake area of the Northwest Territories, general statistics pertaining to which are included with those for the silver-lead-zinc mining industry.

In 1936 the net value of ores, concentrates, etc., shipped from mines comprising the industry totalled \$13,814,645 as compared with a value of \$10,553,086 in 1935. The number of operating properties totalled 89, of which 73 were located in British Columbia, 10 in the Yukon, 5 in Quebec and 1 in Nova Scotia. Capital employed in the industry during 1936 was estimated at \$19,372,600; \$2,917,832 were distributed as salaries and wages to 1,870 employees; \$680,677 in fuel and electricity were consumed and explosives and other process supplies used were computed at \$1,213,818.

Nova Scotia.—In October, 1935, the British Metals Corporation of Canada, Ltd., recommenced operations at its property in Sterling, Richmond county. Both the mine and mill were operated steadily throughout 1936 and auriferous silver-lead-copper and zinc concentrates were produced and exported to European smelters.

Quebec.—In Christie township, Gaspé County, development work was conducted on a property by the Christie Mining Syndicate, Inc. The ore here is reported as being of a complex nature containing lead, zinc, silver and gold. Work consisted of road construction, trenching, stripping, shaft sinking, and the construction of camp buildings.

The property of the Gulf Development Co. Ltd., located in Mann township, Restigouche, was active from June to December; a considerable amount of underground work was completed and a relatively small tonnage of silver-lead-zinc ore was exported to England.

At Montauban Les Mines, the Tetreault mine and mill were in operation throughout 1936. Production at this property consisted of auriferous silver-lead and zinc concentrates which were exported for treatment in European smelters. Prospecting of lead and zinc bearing deposits was also conducted by the Mega Mining Syndicate and in Portneuf county by the Shawinigan Mining and Smelting Co. Ltd.

Ontario.—No reports of any actual mining operations conducted on lead-zinc deposits in Ontario were received during 1936. Lennox Mines Ltd., however, reported that it was diamond drilling a lead-bearing deposit located in Sheffield township, Lennox and Addington counties. It was also reported in the press that other Eastern Ontario lead-bearing deposits, including that at Galetta, would be investigated or possibly developed during 1937.

British Columbia.—British Columbia is pre-eminent as a producer of silver-lead-zinc ores in Canada. In 1936 the net value of production by the silver-lead-zinc mining industry in this province alone totalled \$13,396,471 or 96.9 per cent of that for the entire Dominion. Salaries and wages amounting to \$2,060,038 were distributed to 1,274 employees; fuel and purchased electricity used totalled \$391,303, and explosives, drill steel, etc., consumed amounted to \$732,047.

The great Sullivan mine, located at Kimberley and operated by the Consolidated Mining and Smelting Company of Canada, Ltd., is not only the greatest single producer of silver, lead and zinc in Canada but one of the most important world sources of these particular metals. In 1936 total production at the mine amounted to 1,898,099 tons, comprising 1,897,826 tons of silver-lead-zinc ore shipped to the concentrator at Kimberley and 273 tons of crude lead ore to the smelter at Tadanaac, an increase of 38,928 tons over the production of the previous year. The concentrator treated 1,901,476 tons, an average of 5,976 tons per day, and produced 253,154 tons of lead concentrates and 181,088 tons of zinc concentrates, containing 6,937,059 ounces of silver, 369,954,491 pounds of lead and 237,399,453 pounds of zinc. The average feed to the ball mills contained .04 ounces more silver, 13.6 pounds more lead and .8 pounds more zinc than in the previous year. Recoveries, though subject to some variation, were slightly better over the period under review.

Salvage operations and those preparatory to filling were carried on continuously at the Sullivan throughout the year and were responsible for 41.5 per cent of the ore shipped to the concentrator. Filling operations were continued and were responsible for the placing of 163,692 cubic yards, of which 114,350 cubic yards were surface material placed during the summer, 11,342 cubic yards were development waste and 38,000 cubic yards were waste from caving. Fully developed ore reserves were well maintained with an indicated ratio of lead to zinc, 1.6265 to 1.

All operations at the Monarch and Kicking Horse mines, located near Field, were principally confined to a programme of diamond-drilling, prospecting and development work; the mill has remained closed since December, 1935. Base Metals Mining Corp. Ltd., the owners, reported that exploration has resulted in the discovery of one new orebody in the East Monarch section; sampling and assaying of 680 tons of development rock from this orebody was reported to indicate an average metal content of 8.1 per cent lead, 19.3 per cent zinc, and 1.30 ounces of silver per ton.

Other firms to conduct important silver-lead-zinc mining operations during 1936 included—Allico Silver Mines Ltd. (Revelstoke, M.D.); Beavertell Wellington Syndicate Ltd. (Greenwood M.D.); Beaver Silver Mines Ltd. (Greenwood M.D.); Bell Mine Ltd. (Wallace Mountain);

Cons. Queen Bess Mines Ltd. (Alamo); Denver Mining Syndicate (Slocan); Highland Bell Ltd. (Wallace Mountain); Nicola Mines and Metals Ltd. (Stump Lake); Sally Mines Ltd. (Kettle River M.D.); Ottawa Silver Mining & Milling Co. (Slocan); Salmo-Malartic Mines Ltd. (Nelson M.D.); The Welldun Mining, Milling and Power Co. Ltd. (Stewart), and the Western Exploration Co. Ltd. (Kaslo M.D.).

In addition to the operations listed above, there were many other properties that reported shipments or development work. The year was featured by the relatively large number of operators, many of whom were lessees, that reported exports of crude ore to European metallurgical plants.

Northwest Territories.—For statistical purposes, the data pertaining to the mining of pitchblende-silver ores in the Northwest Territories are included with those relating to the silver-lead-zinc mining industry. Eldorado Gold Mines Ltd., the principal Canadian producer of these ores, reported—"during 1936 the underground workings on No. 2 vein were extended to a depth of 500 feet below the adit level. New levels were opened at 465 and 590 foot horizons. During the year 22,946.7 tons of ore were milled and at the end of the year ore reserves totalled 25,567.7 tons. Flotation and other concentrates together with cobbled ore produced during 1936 totalled 401.5 tons with a gross value of \$1,349,388. Shipments from the mine consisted of 326.5 tons of pitchblende concentrate to the Port Hope refinery and 40.5 tons of copper-silver concentrate to Tacoma. Incoming air freight to the mine totalled approximately 60,000 pounds . . . quite an amount of silver is contained in the pitchblende ore; the pitchblende ore, however, is but a small percentage of the mineral-bearing rock that forms the veins. The balance and larger percentage of the mineral bearing rock also contains excellent values in silver, copper, etc. This ore is treated separately in the mill and the concentrates then shipped to custom smelters at Tacoma and elsewhere for final metal recovery."

Underground development on the 350 foot level of the Consolidated Mining and Smelting Company's Echo Bay property was continued until major supplies were exhausted about June 15, 1936, when the property was closed pending favourable silver prices. Total work for the year comprised 1,110.5 feet of drifting and 242.5 feet of crosscutting.

A small amount of prospecting work was conducted at Beaverlodge Lake by Hottah Lake Gold and Radium Mines Ltd. and at Cameron Bay the El-Bonanza Mining Corp. Ltd. was active from January to June; a relatively small shipment of silver ore was made by this company. It was also reported that development work was conducted at Contact Lake by Bear Exploration and Radium Ltd.

Yukon Territory.—The Treadwell Yukon Co. Ltd. is the largest producer of silver-lead ores in the Yukon; mining operations were conducted by this company throughout 1936 and the mill was in operation from March until the end of the year. The Comptroller for the Territory in his report for the fiscal year ending March 31, 1937, reports—"Three different properties were operated by the Treadwell Company during the year, namely, the "Elsa", the "Silver King", and the "Hector" groups of claims, all on Galena Hill. The mill at the "Elsa" was operated continuously after supplies of diesel oil were received in the summer of 1936. The output for the season was approximately 12,000 tons of high grade silver or lead ores and mill concentrates, the concentrates amounting to approximately ten thousand tons. During the season of navigation in 1936, on account of loss of river steamers operated by the White Pass and Yukon Route, the shipment of ore and concentrates by the Treadwell Yukon Company, Ltd., was limited to 2,064 tons, consisting of 1,481 tons of concentrates and 583 tons of crude ore. The shipment contained 621,718 ounces of silver and 1,889,916 pounds of lead and had a gross market value of \$375,233.86. In addition to the Treadwell Yukon Company's shipments, 683 tons of crude ore was shipped by individuals, the gross value of which was \$114,037. It is reported that sufficient ore has been located on the three properties at present being operated by the Treadwell Yukon Company to maintain present scale operations for five years. The ore and concentrates shipments during 1937 will be limited to approximately 10,000 tons which is the capacity of the steam boats of the transportation company. Individual claim owners in the Mayo district have been active in prospecting and developing their ground, and some very rich discoveries have been made."

Table 69.—Ore Mined and Milled in the Silver-Lead-Zinc Mining Industry(*) in Canada, 1935 and 1936

		Yukon and Northwest Territories	British Columbia, Quebec and Nova Scotia	Canada
1935				
Ore mined.....	tons	14,724	2,120,025	2,134,749
Ore milled.....	tons	14,460	2,103,933	2,118,393
Concentrates produced—Lead.....	tons		238,891	238,891
Zinc.....	tons		230,956	230,956
Pitchblende-silver.....	tons	296		296
1936				
Ore mined.....	tons	51,963	2,144,519	2,196,482
Ore milled.....	tons	50,384	2,124,231	2,174,615
Concentrates produced—Lead.....	tons	4,239	261,185	265,424
Zinc.....	tons		235,544	235,544
Pitchblende-silver.....	tons	393		393
Silver.....	tons	88		88

* Includes silver-pitchblende ores mined in Northwest Territories.

Table 70.—Destination and Shipments from Silver-Lead-Zinc Mines of Canada, 1935 and 1936

Product shipped	Tons shipped	Value at shipping point	Total metal content as determined by settlement assay:			
			Gold	Silver	Lead	Zinc
		\$	fine oz.	fine oz.	pounds	pounds
1935						
To Canadian smelters—						
Lead ore.....	11,597	518,957	1,279	782,229	3,777,338	968,513
Lead concentrates.....	225,939	8,662,762	5,718	6,352,259	316,672,349	16,271,062
Zinc ore.....						
Zinc concentrate (*).....	200,437	1,819,968		442,332	13,690,945	204,829,152
Dry ore (a).....	7,731	170,477	79	316,072	293,299	2,940
Total.....	445,704	11,172,164	7,076	7,892,892	334,433,931	222,071,667
To Foreign smelters—						
Lead ore.....	154	22,086	7	40,109	138,594	
Lead concentrates.....	8,752	387,166	1,196	354,676	11,204,157	223,490
Zinc ore.....						
Zinc concentrates (*).....	20,379	176,524	511	97,546	220,218	20,823,340
Dry ore.....	16	968		1,495	1,946	
Total.....	29,301	586,744	1,714	493,826	11,564,915	21,046,830
Grand Total—1935 (Gross).....		11,758,908	(d)			
Cost of fuel and purchased electricity (b).....		438,126				
Cost of process supplies (b).....		767,696				
Net value—1935.....		10,553,086				
1936						
To Canadian smelters—						
Lead ore.....	5,012	306,755	190	721,627	1,119,311	505,136
Lead concentrates (a).....	252,091	11,738,751	81	6,640,674	352,915,726	19,535,816
Zinc concentrates (*).....	181,088	2,540,665		375,881	11,571,340	185,514,106
Dry ore.....	1,976	54,330	837	92,744	25,395	18,675
Silver concentrates (c).....	2	5,833		13,143		
Total.....	440,169	14,646,334	1,108	7,844,069	365,631,772	205,573,733
To Foreign smelters—						
Lead ore.....	2,703	194,696	75	441,981	2,840,088	94,423
Lead concentrates.....	7,887	504,119	3,946	766,185	5,938,438	29,958
Silver concentrates (c).....	41	28,147		62,548		
Zinc concentrates (*).....	31,826	333,261	504	122,363	958,344	32,443,675
Dry ore.....	39	2,583	83	765		
Total.....	42,496	1,062,806	4,608	1,393,842	9,736,870	32,568,056
Grand Total—1936 (Gross).....		15,709,140	(d)			
Cost of fuel and purchased electricity (b).....		680,677				
Cost of process supplies (b).....		1,213,818				
Net value—1936.....		13,814,645				

(*) Does not include any zinc concentrates produced from copper-gold-zinc ores in Manitoba, Saskatchewan or British Columbia.

(a) Includes shipments of silver-pitchblende concentrates from Northwest Territories. Information relating to radium content of pitchblende is not available for publication.

(b) Deducted for the first time in 1935.

(c) Recovered from pitchblende-silver ores.

(d) Less freight and treatment charges.

NOTE.—In addition to the metal contained in shipments listed above, there are important quantities of lead and silver contained in ores shipped from certain gold mines in British Columbia, also in 1936 copper amounting to 822,569 pounds was contained in lead ores and concentrates shipped to foreign smelters.

Table 71.—Capital Employed in the Silver-Lead-Zinc Mining Industry in Canada, 1936

Province	Present cash value of land excluding minerals	Present value of buildings, fixtures, machinery, tools and other equipment	Inventory value of materials on hand, ore in process, fuel and miscellaneous supplies on hand	Inventory value of finished products on hand	Operating capital (cash, bills and accounts receivable, prepaid expenses, etc.)	Total
1936	\$	\$	\$	\$	\$	\$
Nova Scotia, Quebec, Yukon and N.W.T.*	684,285	245,572	259,438	388,513	405,492	1,983,300
British Columbia.....	8,966,608	6,596,537	1,525,555	1,923	298,677	17,389,300
Canada.....	9,650,893	6,842,109	1,784,993	390,436	704,169	19,372,600

* Includes data relating to silver and silver-pitchblende ores mined in the Northwest Territories.

Table 72.—Employees, Salaries and Wages in the Silver-Lead-Zinc Mining Industry in Canada, 1936

Province	On salary	Mine		Mill	Total	Salaries and wages
		Surface	Under-ground			
British Columbia.....	190	277	555	252	1,274	2,060,038
Nova Scotia, Quebec, Yukon, and N.W.T.†	65	148	249	134	596	857,794
Canada.....	255	425	804	386	1,870	2,917,832

† Includes data on silver-radium mining operations in the Northwest Territories.

Table 73.—Wage-Earners, by Months, in the Silver-Lead-Zinc Mining Industry, 1936

Month	Mine		Mill
	Surface	Under-ground	
January.....	447	804	382
February.....	425	794	381
March.....	423	807	400
April.....	398	752	358
May.....	429	792	371
June.....	457	810	372
July.....	462	770	398
August.....	412	812	384
September.....	404	820	393
October.....	423	842	389
November.....	412	831	400
December.....	387	811	389

4. Commodity Statistics—including tables showing production by provinces, imports, exports, prices, and world output of Arsenic, Cobalt, Silver, Lead and Zinc

ARSENIC

The commercial production of primary arsenic in Canada during 1936 totalled 1,365,606 pounds valued at \$42,491; this came entirely from cobalt-silver-arsenic ores treated by the Deloro Smelting and Refining Company, Limited, Deloro, Ontario. The element was recovered and marketed by this company in the form of arsenious oxide or white arsenic. The maximum annual output of white arsenic in Canada occurred in 1919 when a production of 2,859 short tons was

recorded. In 1886 the Deloro mine in the county of Hastings, Ontario, was believed to have been the only mine in Canada producing arsenic; in that year 120 tons of refined arsenious oxide was obtained as a by-product in the roasting of the auriferous quartz and mispickel of that mine.

Between 1907 and 1910 shipments of cyanided concentrates containing arsenopyrite were made from a gold mine in Nova Scotia while for a number of years arsenopyrite-gold concentrates were produced for export at the Hedley gold mine in British Columbia. During recent years considerable research work has been conducted on arsenical gold ores mined in Northwestern Quebec.

The greater part of the arsenic recovered throughout the world is obtained as a by-product of general smelting operations. In 1935 the principal arsenic producing countries were the United States, Mexico, Sweden, Belgium, and Australia.

Arsenic is consumed chiefly in the manufacture of insecticides, weed killers, glass, wood preservatives, and certain medicines. A recent patent describes the use of arsenic for the manufacture of a hydraulic cement that is reported to be highly resistant to disintegration; another patent describes the preparation of an arsenic cement by the utilization of arsenic trioxide.

Imports of arsenious oxide into Canada during 1936 totalled only 529 pounds valued at \$90 while exports of the material in the same year amounted to 688,400 pounds worth \$25,004. Arsenic was quoted in the United Kingdom at the close of the year as follows: London, £13 10s. per ton, c.i.f. main U.K. ports for imported material; Cornish nominal, £22 10s., f.o.b. mines. Scotland: white powdered, £17 10s. ex. store. United States—arsenious oxide, per pound, 3½ cents delivered, carload lots.

Table 74.—Production of Arsenic in Canada, 1927-1936

(For production from 1885-1926, see Annual Report Mineral Production, 1928)

Year	Arsenic in ore		White arsenic		Year	Arsenic in ore		White arsenic	
	tons	\$	tons	\$		tons	\$	tons	\$
1927.....	667	15,644	2,447	196,335	1932.....			1,212	98,714
1928.....	708	16,539	2,008	176,513	1933.....			734	56,534
1929.....	766	17,314	1,849	154,006	1934.....			824	56,412
1930.....	1,011	34,523	1,250	95,004	1935.....			1,279	75,326
1931.....			1,787	135,170	1936.....			683	42,491

*A relatively small quantity of auriferous arsenical pyrites was exported from Nova Scotia in 1934; no payment was made for arsenic content.

Table 75.—Production in Canada, Imports and Exports of Arsenic, 1935 and 1936

	1935		1936	
	Quantity	Value	Quantity	Value
	pounds	\$	pounds	\$
PRODUCTION (*)—				
White arsenic and arsenic in other forms.....	2,558,789	75,326	1,365,606	42,491
Total.....	2,558,789	75,326	1,365,606	42,491
IMPORTS—				
White arsenic (arsenious oxide).....	11,759	546	529	90
Sulphide of arsenic.....	27,777	3,496	17,949	2,307
Soda, arseniate of, biarseniate and stannate of.....	2,128	666	6,520	1,863
Arsenate of lead.....	324,328	26,388	223,300	20,096
Arsenate of lime.....	144,023	7,786	276,552	16,372
Total.....		38,882		40,728
EXPORTS—Arsenic—				
Total.....	2,230,600	69,866	688,400	25,004

(*) Entirely from Ontario.

Table 76.—Consumption of Arsenious Oxide and Arsenic Acid in the Manufacture of Canadian Insecticides, 1932-1936

Year	Pounds	\$	Year	Pounds	\$
1932.....	1,721,044	69,250	1935.....	2,736,089	86,983
1933.....	3,116,401	110,011	1936.....	3,368,956	106,132
1934.....	4,709,443	168,185			

Table 77.—World's Production of Arsenic, 1935 and 1936

(Taken from the *Imperial Institute's* publication "The Mineral Industry of the British Empire and Foreign Countries")
(Long tons)

Producing country and description	1935	1936
BRITISH EMPIRE—		
United Kingdom..... White arsenic and arsenic soot.....	172	153
Canada (sales)..... White arsenic.....	1,142	610
Australia..... White arsenic.....	4,098	3,691
FOREIGN COUNTRIES—		
Belgium (exports)..... White arsenic.....	3,049	2,688
Czechoslovakia..... Ore (As. content).....	68	53
France..... Ore (As. content).....	3,538	(a)
..... White arsenic (As. content).....	5,794	(a)
Germany..... Ore (As. content).....	1,294	1,843
Greece..... White arsenic.....	164	84
..... Pyrites (As. content).....	300	(a)
Portugal..... Pyrites (As. content).....		98
..... White arsenic.....	74	148
Roumania..... Pyrites (As. content).....	29	30
Sweden..... Ore (As. content).....	24,032	22,944
..... White arsenic.....	6,250	8,510
Mexico..... White arsenic.....	9,793	8,392
United States..... White arsenic.....	12,712	13,731
Brazil..... White arsenic.....	681	720
China..... Ore (b).....	1,200	(a)
Japan..... White arsenic.....	3,111	(a)
Korea..... White arsenic.....	367	226
Turkey..... Ore (As. content).....	27	16

White arsenic is also produced in Germany and U.S.S.R. (Russia).

(a) Information not available.

(b) Content varies from 20 to 60 per cent arsenic.

COBALT

Canadian production of cobalt in 1936 at 887,591 pounds was the largest since 1929, in which year the output was computed at 929,415 pounds. Cobalt production in Canada comes entirely from the cobalt-silver deposits of Northern Ontario. Production of the metal in the Dominion represents the cobalt content of ores exported together with the metal content of salts or oxides and metallic cobalt produced in Canadian plants.

There is at present only one smelter in Canada treating cobalt ores; this is the plant of the Deloro Smelting and Refining Company, Limited, located at Deloro, Ontario. This company produced mixed nickel and cobalt oxides at Deloro for the first time in 1910. Continuous operations were conducted by the company throughout 1936 and production included cobalt metal, cobalt salts and cobalt oxide.

The Belgian Congo and Northern Rhodesia are now the world's principal cobalt producers. Northern Rhodesia is the largest producer of the metal in the British Empire. Cobalt occurs here as the sulphide linnaeite (Co_3S_4), in the N'Kana copper ore deposit in amounts up to 0.5 per cent cobalt and, according to the Imperial Institute, London, the metal is recovered as ferro-cobalt during the copper smelting; it is exported mainly to the United States and Belgium. Production in 1936 was reported at 1,016,736 pounds.

The Chemical Trade Journal and Chemical Engineer, London, recently commented on cobalt, as follows: "Cobalt is now going into extensive consumption in the manufacture of special alloys and of catalysts in various coal-oil processes, whilst the sustained call for cobalt compounds in

the form of ceramic colours, and for paint and varnish driers, has contributed to maintain the strength of the market . . . Canada, Rhodesia, and the Belgian Congo are at present the dominant factors in the international cobalt position, and the close understanding that prevails among those responsible for marketing the metal and its oxides from these sources has been responsible for the stability of cobalt prices during a period in which values of many other metals have fluctuated considerably. If, as is reported, Russia is eventually to figure as a major factor in the world's cobalt industry, a greater degree of competitive selling may be experienced . . ."

Cobalt was quoted in the United Kingdom, September, 1937, at from 8s. 6d. to 8s. 7d. per pound, Engineering and Mining Journal. "Metal and Mineral Markets", August, 1937, quotations for cobalt ore were: per pound of cobalt: 9 per cent grade, 40 cents; 10 per cent, 42½ cents; 11 per cent, 45 cents; 12 per cent, 47½ cents; 13 per cent, 50 cents; 14 per cent, 52½ cents; 14 and up to 15 per cent, 55 cents. Carload lots, f.o.b. Ontario.

Table 78.—Production of Cobalt from Canadian Ores, 1927-1936

Year	Pounds	\$	Year	Pounds	\$
1927.....	880,590	1,764,524	1932.....	490,631	587,957
1928.....	956,590	1,672,320	1933.....	466,702	597,752
1929.....	929,415	1,801,915	1934.....	594,671	592,497
1930.....	694,163	1,144,007	1935.....	681,419	512,705
1931.....	521,051	651,179	1936.....	887,591	804,676

NOTE.—For years 1904 to 1926, see previous reports.

Table 79.—Production in Canada, Imports and Exports of Cobalt, 1935 and 1936

	1935		1936	
	Quantity	\$	Quantity	\$
PRODUCTION (in terms of metallic cobalt contained in metal and oxides sold and in ores and residues exported).....pounds	681,419	512,705	887,591	804,676
IMPORTS—				
Cobalt ore.....pounds				
Oxide of cobalt.....pounds	160	173	410	610
EXPORTS—				
Cobalt, contained in ore..... cwt.	4,193	124,679	5,262	212,814
Cobalt, metallic.....pounds	1,803	2,253	2,376	2,970
Cobalt alloys.....pounds	26,405	44,462	43,211	70,372
Cobalt oxides and cobalt salts.....pounds	378,274	370,160	484,541	556,791

Table 80.—World's Production of Cobalt, 1935 and 1936

(Taken from the *Imperial Institute's* publication "The Mineral Industry of the British Empire and Foreign Countries")
(Cwt.)

Producing Country	1935	1936
BRITISH EMPIRE—		
Northern Rhodesia.....	8,203	9,078
Canada (c).....	6,084	7,925
India (b).....	4,452	3,970
Australia (metal).....		
FOREIGN COUNTRIES—		
French Morocco.....	8,759	8,600
Japan (ore).....	188	(a)

NOTE.—Cobalt is also obtained in Belgium from material shipped from the Belgian Congo and complex ores containing cobalt are produced in Germany, Greece, Japan and China, but figures of cobalt content are not available.

(a) Information not available.

(b) Estimated cobalt content of nickel speiss exported to Hamburg.

(c) Metal recovered from smelter products plus cobalt contained in cobalt residues exported.

SILVER

A report issued by the United States Bureau of Mines states: "Producers of newly mined silver in the United States in 1936 began the year under the stimulus of the government price of \$0.7757. Acting under the President's proclamation of December 21, 1933, and the Silver Purchase Act of 1934, the Secretary of the Treasury on April 10, 1935, raised the price paid to \$0.7111 (55 per cent of \$1.292929¢) and on April 24 the same year to \$0.7757 (60 per cent of \$1.292929¢), where it remained to the end of 1936. Production of silver in the United States and the Philippines in 1933 was 23,317,159 ounces valued (at \$0.35 per ounce), \$8,161,006. The increase in 1936 over 1933 was 160 per cent in quantity and 472 per cent in value."

At the London Monetary and Economic Conference of July, 1933, the chief producing silver countries—Australia, Canada, Mexico, Peru and the United States—agreed not to sell any silver but to make aggregate purchases from (or otherwise arrange for withholding from market) domestic production totalling 35 million ounces annually. Under a separate Five-Power agreement, of the same date, Canada accepted the quota of 1,671,802 ounces as her share of the total amount to be purchased (or otherwise withheld from sale). The action of the delegate of Canada in signing this agreement at London was approved by Parliament on February 26, 1934. In 1934 the Minister of Finance purchased 1,671,802 ounces of newly mined Canadian silver.

On March 11, 1935, when the Bank of Canada commenced operations, the silver then held by the Government was transferred to that institution, which assumed the liability of the Dominion notes outstanding. The silver transferred to the Bank of Canada and future purchases by it will form part of the reserve of the Bank of Canada (Section 26 (a), Bank of Canada Act). In both 1935 and 1936 the Bank of Canada purchased the required quota of silver, viz., 1,671,802 fine ounces. On October 13, 1937, the Bank of Canada reported in its weekly statement silver bullion held as \$2,647,087.07, valued at the current market price.

The London silver agreement expired on December 31, 1937, was not renewed.

CANADIAN COMMODITY EXCHANGE

SILVER MARKET, 1936

(Contributed by the Canadian Commodity Exchange, Inc., Montreal, Quebec.)

A total of 1,908 contracts representing 19,080,000 ounces of silver 999 fine were sold on the Canadian Commodity Exchange, Inc., during 1936. March, May, July, September and December were the most heavily traded options.

With the exception of an unsettled opening and a few speculative flurries in the course of the year, the market was quiet and steady throughout the year with only small variations in price.

The year opened under critical conditions for silver in that the American Treasury had withdrawn from the London market in December of 1935. Nevertheless, the United States purchasing program dominated the market throughout the year. On the first day of the year the United States Treasury's open market buying rate was 50 cents an ounce, but by January 20th, it had been reduced to 45 cents where it remained for the balance of the year.

On the Canadian Commodity Exchange, the price of the current option opened at 48.25 cents an ounce, near the high of 48.95 established in November, but dropped rapidly to reach its low for the year of 42.85 cents in the same month.

The fixing of a forward price by London on February 5, for the first time since December 9, 1935, stabilized the market somewhat, although futures remained at a discount from spot. In February the current option established a high of 45.20 and a low of 44.75, while the range for May futures was 45.10 to 44.00 and for September 44.95 to 44.85.

Minor rallies occurred in the early part of the year, chiefly on Indian speculative buying. The American presidential election, however, brought a substantial speculative advance in November when the spot month reached a high of 48.95 cents an ounce on the Canadian Commodity Exchange. The re-election of Mr. Roosevelt, however, failed to alter the American purchasing policy, as that government continued to rely chiefly on direct purchases from producing countries rather than upon the open market, and as a result silver prices sagged. By the year end prices on the Canadian Commodity Exchange had reverted to around 46 cents an ounce.

A characteristic of the year was a gradual trend towards a somewhat more normal spread between prices for current and future options. Even by December, however, the far futures only commanded a very slight premium.

Table 81.—Production of silver in Canada, by provinces and by sources, 1935 and 1936

	1935		1936	
	Quantity	Value	Quantity	Value
	fine oz.	\$	fine oz.	\$
NOVA SCOTIA—				
In gold bullion and in silver-lead-zinc ores exported—Total.....	372	241	107,642	48,576
QUEBEC—				
In blister copper.....	472,688	306,254	500,392	225,812
In gold ores and in copper and silver-lead-zinc ores exported.....	196,148	127,084	223,947	101,060
Total.....	668,836	433,338	724,339	326,872
ONTARIO—				
In silver bullion and nuggets.....	2,022,296	1,310,244	1,863,183	840,798
In gold bullion.....	441,982	286,360	476,723	215,131
In blister copper.....	2,188,092	1,417,663	2,432,774	1,097,838
In ores, concentrates, residues and matte exported or treated in smelters outside the province.....	509,281	329,962	446,686	201,576
Total.....	5,161,651	3,344,229	5,219,366	2,355,343
MANITOBA—				
In gold bullion and in blister copper—Total.....	1,206,454	781,660	791,489	357,175
SASKATCHEWAN—				
In copper-gold-silver ores shipped to Canadian smelters (a)—Total.....	201,608	130,622	642,497	289,940
ALBERTA—				
In alluvial gold—Total.....	16	10	9	4
BRITISH COLUMBIA—				
In alluvial gold.....	5,567	3,607	7,810	3,525
In gold bullion.....	44,992	29,150	53,272	24,040
In blister copper.....	282,050	182,740		
In base bullion and in ores exported.....	8,845,791	5,731,180	9,687,633	4,371,738
Total.....	9,178,400	5,946,677	9,748,715	4,399,303
YUKON—				
In alluvial gold.....	8,034	5,205	11,293	5,096
In silver-lead ores shipped to smelters.....	46,681	30,245	772,123	348,436
Total.....	54,715	35,450	783,416	353,532
NORTHWEST TERRITORIES—				
In pitchblende-silver or other ores shipped to smelters (x)—Total.....	146,506	94,921	317,014	143,059
Total—Canada.....	16,618,558	10,767,148	18,334,487	8,273,804

(x) Comprises silver in bullion, etc., made at the Eldorado refinery, Port Hope, Ont. plus silver in ores shipped to other metallurgical plants.

(a) Represents silver contained in blister copper made at the Flin Flon smelter from Saskatchewan ores.

Table 82.—Production of Silver in Canada for Years Specified, 1887-1936

Year	Ounces	Cents per ounce	Year	Ounces	Cents per ounce
1887.....	355,083	98-00	1926.....	22,371,924	62-11
1891.....	414,523	98-00	1927.....	22,736,698	56-37
1896.....	3,205,343	67-06	1928.....	21,936,407	58-18
1901.....	5,539,192	58-95	1929.....	23,143,261	52-99
1906.....	8,473,879	66-79	1930.....	26,443,823	38-15
1910 (x).....	32,869,264	53-49	1931.....	20,562,247	29-87
1911.....	32,559,044	53-30	1932.....	18,347,907	31-67
1916.....	25,459,741	65-66	1933.....	15,187,950	37-83
1919.....	16,020,657 (a)	111-122	1934.....	16,415,282	47-46
1920.....	13,330,357	100-90	1935.....	16,618,558	64-79
1925.....	20,228,988	69-06	1936.....	18,334,487	45-13

(x) Year of maximum output. (a) Highest price per ounce recorded since 1887.

From 1887 to 1936, inclusive, the silver production in Canada amounted to 715,304,414 fine ounces valued at \$425,339,764.

Table 83.—Production of Silver, by Principal Silver-producing Provinces, 1927-1936

(For the years 1887 to 1926 see 1928 report on the Mineral Production of Canada)

Year	Quebec		Ontario		Manitoba		British Columbia		Yukon Territory†	
	Fine ounces	Value	Fine ounces	Value	Fine ounces	Value	Fine ounces	Value	Fine ounces	Value
		\$		\$		\$		\$		\$
1927.....	740,864	417,625	9,307,953	5,246,893	12	7	11,040,445	6,223,499	1,647,295	928,580
1928.....	908,959	528,796	7,242,601	4,213,456	1,763	1,026	10,943,367	6,366,413	2,839,633	1,651,985
1929.....	813,821	431,268	8,890,726	4,711,462	2,644	1,401	10,156,408	5,382,185	3,279,530	1,737,922
1930.....	571,164	217,922	10,205,683	3,893,876	94,653	36,114	11,825,930	4,512,065	3,746,326	1,429,373
1931.....	530,345	158,414	7,438,951	2,222,014	836,547	249,877	8,061,599	2,408,000	3,664,728	1,103,615
1932†.....	628,902	199,184	6,335,788	2,006,648	1,036,497	328,275	7,293,462	2,309,958	3,053,188	966,994
1933.....	471,419	178,551	4,535,680	1,715,975	1,101,578	416,758	6,737,057	2,548,817	2,227,476	842,717
1934.....	470,254	223,187	5,321,160	2,525,470	1,252,920	594,647	8,729,721	4,143,204	553,320	262,611
1935.....	668,836	433,338	5,161,561	3,344,229	1,206,454	781,660	9,178,400	5,946,677	201,221	130,371
1936.....	724,339	326,872	5,219,366	2,355,343	791,489	357,175	9,748,715	4,399,303	1,100,430	496,591

†Northwest Territories production included with Yukon since 1932.

For data relating to silver in mine shipments from Cobalt District and nearby camps in Ontario, see previous reports. In 1935 Saskatchewan was credited with 201,608 fine ounces valued at \$130,622, representing the estimated metal recovered from that part of the Flin Flon mine situated in Saskatchewan. In 1936, Saskatchewan production from the same source was 642,497 fine ounces valued at \$289,940.

Table 84.—Source of Canadian Silver Production, by Percentages, 1934-1936

	1934	1935	1936
In silver-cobalt ores.....	18.7	15.0	12.2
(x) In base bullion.....	45.1	47.9	46.3
In gold ores (bullion and placer).....	7.2	7.4	9.7
In blister copper.....	23.4	26.1	23.8
In matte, copper ores and silver-lead ores, etc., exported.....	5.6	3.6	8.0
	100.0	100.0	100.0

(x) Chiefly from silver-lead ores.

Table 85.—Average Commercial Ratio of Silver to Gold for Each Specified Year Since 1700

(Supplied by United States Mint)

Year	—	Year	—	Year	—
1700.....	14.81	1895.....	31.60	1931.....	71.25
1750.....	14.55	1900.....	33.33	1932.....	73.29
1800.....	15.69	1905.....	33.87	1933.....	59.06
1850.....	15.70	1910.....	38.22	1934.....	72.49
1875.....	16.64	1915.....	40.48	1935.....	54.74
1880.....	18.05	1920.....	20.28	1936†.....	77.60
1885.....	19.41	1925.....	29.78		
1890.....	19.75	1930.....	53.74		

†Estimated on averages in Canadian funds.

Table 86.—Silver Consumed in Specified Canadian Industries, 1935 and 1936

Industry	1935		1936	
	Fine oz.	Value	Fine oz.	Value
Scientific equipment.....		\$		\$
Fountain pens and pencils.....	614,378	361,775	657,042	320,467
Jewellery and silverware.....		363,727		343,397
Medicinal and pharmaceutical preparations (bullion).....	36,260	21,735	46,426	21,285
Miscellaneous chemicals.....	17,424	7,841	19,000	8,740

(a) Consumed largely in the manufacture of photographic film.

Table 87.—Imports into Canada and Exports of Silver, 1935 and 1936

	1935		1936	
	Quantity	Value	Quantity	Value
	fine oz.	\$	fine oz.	\$
IMPORTS—				
Silver in bars, etc., unmanufactured.....		5,584,906		2,389,842
Silver, manufactures of, n.o.p., and articles consisting wholly or in part of sterling or other silverware.....		64,596		115,513
Silver and other coin except gold.....				
Toilet articles of which the most important component, in value, is sterling silver (†).....		41,808		43,234
Total		5,691,310		2,548,589
EXPORTS—				
Silver contained in ore, concentrates, etc.....	1,364,008	882,106	3,347,167	1,494,237
Silver bullion—Domestic (a).....	16,963,181	10,953,083	12,783,708	5,789,310
Total	18,327,189	11,835,189	16,130,875	7,283,547
Silver bullion—Foreign (b).....	7,098,435	4,501,088	3,093,263	1,410,827
Silver coin—Foreign.....		896,010		931,129
Silver coin—Canadian.....		38,198		65,446

(†) From April 1, 1935.

(a) Of the quantity exported, 15,013,972 ounces in 1935 and 11,264,615 ounces in 1936 went to the United States.

(b) Of these exports, 7,071,784 ounces went to the United States in 1935 and 2,892,275 ounces in 1936.

Table 88.—Monthly Average Prices of Silver, 1934-1936

(From the *Engineering and Mining Journal*)

Month	New York (Cents per fine ounce) ·999 fine			London Spot (Pence per standard ounce) ·925 fine		
	1934	1935	1936	1934	1935	1936
January.....	44-188	54-418	47-250	19-382	24-584	20-250
February.....	45-233	54-602	44-750	20-073	24-818	19-796
March.....	45-875	59-048	44-750	20-278	27-380	19-663
April.....	45-180	67-788	44-892	19-740	30-986	20-245
May.....	44-226	74-356	44-869	19-276	33-865	20-248
June.....	45-173	71-940	44-750	19-981	32-346	19-770
July.....	46-310	68-216	44-750	20-512	30-500	19-590
August.....	48-986	66-366	44-750	21-377	29-476	19-490
September.....	49-484	65-375	44-750	21-888	29-255	19-579
October.....	52-375	65-375	44-750	23-581	29-368	19-977
November.....	54-255	65-375	45-431	24-257	29-284	21-050
December.....	54-390	58-420	45-352	24-404	25-563	21-238
Average	47-973	64-273	45-087	21-229	28-952	20-075

The average price of silver in Canadian funds based on the New York market in 1934, was 47-4609 cents per fine ounce, in 1935, it was 64-7899 cents, and in 1936 it was 45-1264 cents.

Table 89.—Comparative Figures of Silver Production, for the World, Mexico, the United States, Peru, and Canada, 1927-1936

Year	World's Output*	Mexico's Output*	United States Output*	Peru's Output*	Canada's Output
	fine ounces	fine ounces	fine ounces	fine ounces	fine ounces
1927.....	251,096,555	104,573,919	60,394,199	18,295,408	22,736,698
1928.....	257,925,154	108,537,307	58,426,004	21,607,693	21,936,407
1929.....	260,970,029	108,871,442	61,233,321	21,495,169	23,143,261
1930†.....	247,000,000	105,204,050	47,724,903	14,372,593	26,443,823
1931.....	197,000,000	86,064,457	29,856,628	8,794,407	20,562,247
1932 (a).....	165,000,000	69,303,119	22,739,681	3,518,753	18,347,907
1933.....	172,000,000	68,101,062	23,128,783	7,316,828	15,187,950
1934.....	193,000,000	74,143,301	32,782,304	10,366,607	16,415,282
1935.....	223,000,000	75,587,447	48,518,639	17,103,768	16,618,558
1936.....	247,000,000	77,462,114	60,721,128	19,000,000	18,334,487

*Prior to 1930 from Annual Report of the "Director of the Mint," Washington.

†Beginning with 1930, figures from the Imperial Institute.

(a) Excluding the production of U.S.S.R. (Russia) figures for which are not available.

NOTE.—For years 1898 to 1926, see previous reports.

Table 90.—World Production of Silver Ore, 1934-1936

(In terms of metal)
(Supplied by Imperial Institute)
(Fine ounces)

Producing country	1934	1935	1936	Producing country	1934	1935	1936
BRITISH EMPIRE				FOREIGN COUNTRIES concluded			
United Kingdom.....	138,974	92,848	76,885	Roumania.....	417,661	471,872	471,858
Bechuanaland Protectorate.....	957	1,759	1,378	Spain.....	1,788,247	1,450,000	(a)
Gold Coast (estimated).....	11,000	12,000	14,000	Sweden.....	754,496	835,771	939,519
Kenya.....	1,969	3,743	5,721	U.S.S.R. (Russia) (estimated).....	2,900,000	3,900,000	5,000,000
Nigeria.....	81,000	139,200	153,000	Yugoslavia.....	1,767,221	1,753,493	1,785,579
Northern Rhodesia.....	187	151	229,151	Algeria.....	37,000	46,521	(a)
Sierra Leone.....	1,400	1,673	1,537	Belgian Congo.....	3,399,541	3,800,000	2,781,843
Southern Rhodesia.....	128,381	132,087	145,072	Morocco (French zone).....		900	
Tanganyika Territory.....	4,876	6,134	9,254	Mozambique.....	763	725	1,337
Uganda.....	383	346	924	Tunis.....	22,022	17,007	43,000
Union of South Africa.....	1,002,203	1,042,203	1,075,625	Mexico.....	74,143,301	75,587,447	77,462,114
Canada.....	16,415,282	16,618,558	18,334,487	Porto Rico.....	11	8	187
Newfoundland.....	1,103,091	1,123,997	1,249,472	United States.....	32,782,304	48,518,639	60,721,128
British Guiana (estimated).....	3,340	4,010	4,240	Guatemala (c).....	19,068	3,345	(a)
Cyprus.....	(d) 128,264	(d) 44,536	125,704	Honduras.....	3,091,522	2,641,346	3,104,507
India.....	5,817,524	5,850,406	5,977,345	Nicaragua.....	45,241	88,543	111,175
Federated Malay States (estimated).....	2,700	2,600	3,300	Panama.....	11,294	3,370	4,632
Australia.....	11,357,091	11,562,373	12,288,033	Salvador.....	4,848	2,983	3,542
Fiji.....	(a)	634	1,185	Argentina.....	(a)	(a)	522,800
New Guinea (estimated).....	81,000	83,000	97,000	Bolivia (exports).....	5,216,177	7,951,338	10,723,000
New Zealand.....	382,615	437,967	432,973	Brazil.....	22,275	20,833	23,887
Total.....	36,700,000	37,200,000	40,200,000	Chile.....	1,051,115	1,298,725	1,431,350
FOREIGN COUNTRIES				Colombia.....	127,461	132,965	151,501
Austria.....	28,189	18,318	3,848	Ecuador.....	96,354	80,266	74,401
Bulgaria.....	16,493	18,454	(a)	Guiana (French and Dutch) (estimated).....	6,000	6,000	6,000
Czechoslovakia.....	982,422	1,028,645	1,003,862	Peru.....	10,366,607	17,103,768	19,000,000
Finland.....	(a)	(a)	57,934	Venezuela.....	7,000	7,000	7,000
France.....	303,978	509,602	(a)	China.....	147,594	150,000	150,000
Germany.....	5,944,021	6,257,700	6,541,400	Formosa (estimated).....	200,000	(a)	(a)
Greece.....	525,791	217,906	523,623	French Indo-China.....	3,600	3,633	5,594
Hungary.....	13,668	13,263	8,299	Japan.....	6,984,729	8,230,535	9,605,231
Italy.....	373,217	420,000	630,000	Korea.....	1,050,000	1,265,000	1,891,000
Norway.....	200,096	266,080	229,538	"Manchoukuo".....	2,463	3,497	(a)
Poland.....	21,090	32,000	61,000	Netherlands East.....			
Portugal.....			12,905	Indies.....	773,999	701,700	663,049
				Philippine Islands.....	212,700	322,020	467,885
				Total.....	156,000,000	186,000,000	207,000,000
				World's Total.....	193,000,000	223,000,000	249,000,000

(a) Information not available.

(c) Imported into the United States from the country indicated.

(d) Exports.

Table 91.—World Silver Consumption, Production and Other Supplies* 1935 and 1936

(In millions of fine ounces)

WORLD SILVER SUPPLIES	1936	1935	WORLD SILVER CONSUMPTION	1936	1935
Production—			U.S. Government Acquisitions—		
United States.....	64.0	48.5	Domestic production.....	62.7	37.9
Mexico.....	82.1	75.6	Nationalized stocks.....	0.8	1.0
Canada.....	19.2	17.5	Open market purchases.....	317.7	489.4
South America.....	31.4	23.5			
All other countries.....	56.3	53.4		381.2	528.3
Total Production.....	253.0	218.5	Other Government Purchases, under the Eight Nation Silver Pact—		
Other Supplies—			Mexico.....	7.2	7.2
Sales by Hongkong and China, including smuggled silver.....	302.0	190.0	Canada.....	1.7	1.7
Sales by Indian Government.....		29.0	Peru.....	1.1	1.1
Sales by the Soviet Union.....	1.0	19.0	Australia.....	0.6	0.6
Sales by German Government.....	1.0	1.0	Coinage—		
Other Demonetization—			Cuba.....	7.9	15.5
Peru.....		0.5	Venezuela.....	2.8	1.8
Austria.....		2.0	Others.....		0.3
Persia.....		3.4	Indian Consumption.....	100.0	5.0
Indo-China.....		3.5	German Consumption.....	16.0	15.0
Netherland India.....		2.0	Arts and Industries—		
Unallocated Supplies.....		141.1	In the United States and Canada.....	26.5	23.5
			In England.....	12.0	10.0
Total.....	557.0	610.0	Total.....	557.0	610.0

*As estimated by Handy and Harmon, New York.

Table 92.—World's Monetary Stocks of Silver at the Close of 1935 (b)
(Supplied by the United States Mint and subject to revision)
(Stated in United States money, 000's omitted)

Country	Silver stock in banks and treasuries (a)	1935	Country	Silver stock in banks and treasuries (a)	1935
		Per capita			Per capita
	\$	\$		\$	\$
United States (including Hawaii, Alaska and Porto Rico) (1).....	1,451,690	11.19	Iran (Persia) (8) (2).....	22,728	1.52
Canada (1) (4).....	57,084	5.23	Palestine (1).....	9,146	7.52
Mexico (1) (4).....	35,026	1.88	Syria.....	2,122	0.65
Chile (4).....	3,851	0.85	Turkey (1).....	6,192	0.39
Columbia (1) (2).....	7,965	0.94	British West Africa (1).....	10,811	0.45
Peru (1).....	10,902	1.60	Nyasaland (1).....	4,962	3.08
Venezuela (1) (4).....	26,679	8.03	Rhodesia, Northern (1).....	1,224	0.89
Uruguay (1).....	9,719	4.81	Rhodesia, Southern.....	1,235	0.99
Austria (1).....	14,705	2.17	New Zealand (1).....	13,810	8.86
Belgium (6) (4).....	11,297	1.36	Ceylon (1).....	16,858	2.99
France (10).....	38,198	0.91	China (2) (1).....	500,000	1.11
Germany (1).....	508,741	7.64	India—British (1).....	1,300,000	3.54
Bulgaria (1).....	20,068	3.25	Morocco (1) (4).....	4,518	0.81
Czechoslovakia (4).....	9,163	0.60	Japan (including Chosen, Taiwan, Kwantung) (1).....	281,256	2.87
Denmark.....	1,089	0.30	Netherlands East Indies (1).....	62,964	0.98
Hungary (1).....	3,286	0.37	Philippine Islands (1).....	18,858	1.44
Lithuania (1).....	2,539	1.02	Siam.....	10,362	0.78
Great Britain (1).....	422,327	9.01	Egypt (1).....	38,451	2.49
Greece (1) (2).....	2,867	0.42	Ethiopia (1) (11).....	22,544	4.10
Irish Free State (1) (7).....	6,987	2.30	Kenya, Uganda and Tanganyika (2) (1).....	24,008	2.02
Latvia (1).....	14,040	7.17	Sudan—Anglo Egyptian (1).....	12,135	2.09
Netherlands (1).....	93,700	1.10	Union of South Africa (1).....	23,178	2.69
Norway (1) (2).....	3,176	1.80	Australia (2) (1).....	67,055	9.97
Poland (1).....	60,792	0.09	Algeria and Tunis.....	7,956	0.83
Rumania.....	1,681	9.06	Other Countries.....	60,751	
Spain.....	225,244	15.54	Total.....	5,706,529	3.05
Switzerland (1).....	64,700	1.99			
Yugoslavia (1).....	29,800	6.10			
British Malaya (1).....	26,758	0.87			
Indo-China—French (1).....	19,350				

(a) At par equivalent of stated value.

(b) Compiled from such data as are available.

(1) Estimated silver circulation included.

(2) Prior year's figures.

(3) Colombia, average exchange rate of paper peso during December, 1935, \$0.5703; Greece, pegged value since January

24, 1933, of drachma, \$0.0094.

(4) Includes base metal coin.

(5) June 30, 1935.

(6) December 26, 1935.

(7) Exclusive of British coins and currency which still circulate in Irish Free State.

(8) On October 10, 1934.

(9) Incomplete.

(10) On December 24, 1935.

(11) Valued at the United States equivalent of the price of silver in London on December 31, 1935. (\$0.49966 per fine ounce.)

NOTE.—The amount of silver in circulation in many countries is not obtainable, and in some countries that held by private banks cannot be given. The stocks of the Union of Socialist Soviet Republics are omitted because of indefiniteness or lack of available data.

Table 93.—Silver Content of Certain Specified Principal Coins (*)

Country	Coin	Fine silver content
		Grains per unit
United States.....	Dollar.....	371.250
Australia.....	Shilling.....	80.730
Austria.....	Schilling.....	59.260
Brazil.....	Milreis.....	30.860
Canada.....	Dollar.....	288.000
Chile.....	Peso.....	69.400
China.....	Yuan.....	362.559
Colombia.....	Peso.....	347.230
France.....	10 Franc.....	104.940
Germany.....	Mark.....	38.581
Great Britain.....	Shilling.....	43.636
India.....	Rupee.....	165.000
Italy.....	5 Lira.....	64.430
Japan.....	Yen.....	110.000
Mexico.....	Toston.....	51.679
Peru.....	Sol.....	192.905
Poland.....	2-Zloty.....	50.927
Russia.....	Rouble.....	277.782
Spain.....	5 Peseta.....	69.440
Sweden.....	2 Krona.....	92.590

(*) American Bureau of Metal Statistics.

LEAD

Owing to a steadily increasing demand, the improvement in the statistical position of the lead industry recorded in 1935 continued throughout 1936. In this recovery Great Britain was in the forefront, owing to the general economic revival stimulated first by building and later by rearmament. The increase is accounted for chiefly by armaments, electrical engineering (cable sheathing and accumulators), and building, which during 1936 showed a sharp increase. The supply of lead cannot immediately be expanded sufficiently to meet rapidly increasing demand. Almost every important source of lead is closely bound up with the production of zinc and silver, the restriction or expansion of lead production affecting the quantities of the other metals produced. In recent years Australian production has been increasing and in 1932 it became the second largest producer to the United States. The civil war in Spain has interrupted the export of lead from that country; the importance of Spain, as a producer had, however, previously been steadily falling. Coincident with the falling off in Spanish exports, Spain's chief customers have been expanding their domestic production. The Penarroya Company has erected a new smelter and refinery in France at Noyelles-Godault, with an initial capacity of 40,000 m. tons of refined lead. In Japan, in 1935, the Manshu Euko Kabushiki Kaisha was formed to smelt lead ores from Jehol and production was started at the end of 1935; it is hoped to replace all pig lead imports.

The rate of increase in lead production recently achieved will be impossible to maintain and it is from the bringing into production of new areas such as Northern Rhodesia and Kapaonik in Yugoslavia, that increased output must be sought in future.—(O. W. Roskill, *The Mining Journal*, London.)

Table 94.—Production of Lead from Canadian Ores, 1927-1936

Year	Pounds	Value	Price per pound in cents*	Year	Pounds	Value	Price per pound in cents*
		\$				\$	
1927.....	311,423,161	16,477,139	5.256	1932.....	255,947,378	5,409,704	2.114
1928.....	337,946,688	15,553,231	4.576	1933.....	266,475,191	6,372,998	2.392
1929.....	326,522,566	16,544,248	5.054	1934.....	346,276,576	8,436,658	2.436
1930.....	332,894,163	13,102,635	3.927	1935.....	339,105,079	10,624,772	3.133
1931.....	267,342,482	7,260,183	2.710	1936 (a).....	383,180,909	14,993,869	3.913

The data given represent the quantity of lead produced in Canada from domestic ores, together with the estimated lead recovery from lead ores and concentrates exported.

NOTE.—For years 1937 to 1936, see previous reports.

* In Canadian funds.

(a) Year of maximum output of Canadian lead.

Production of lead from Canadian ores from 1887 to 1936, inclusive, totals 5,154,623,103 pounds valued at \$242,128,550.

Table 95.—Production of Lead from Canadian Ores, by Provinces, 1927-1936

(For years 1887 to 1926, see 1928 report on the Mineral Production of Canada)

Year	Quebec		Ontario		British Columbia		Yukon and Northwest Territories	
	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value
1927.....	6,496,577	341,461	7,990,709	528,729	292,770,544	15,388,020	4,165,331	218,929
1928.....	6,218,336	284,520	6,814,757	402,289	317,722,146	14,537,377	7,191,449	329,045
1929.....	5,358,304	270,616	4,769,506	294,431	307,999,153	15,555,189	8,395,603	424,012
1930.....			2,193,856	116,034	321,803,725	12,637,232	8,896,582	349,369
1931.....			985,633	41,647	261,902,236	7,097,812	4,454,613	120,724
1932.....			86,477	1,828	252,007,574	5,326,432	3,853,327	81,444
1933.....			29,910	692	263,345,776	6,298,178	3,099,505	74,128
1934.....			21,558	525	344,467,138	8,392,597	1,786,880	43,536
1935.....	2,047,624	64,156	22,532	706	336,784,326	10,552,059	231,418	7,250
1936.....	2,047,689	80,126	17,442	683	376,645,367	14,738,133	2,568,699	100,513

In addition there were 19,179 pounds valued at \$601 produced in Manitoba in 1935 and 1,901,712 pounds valued at \$74,414 produced in Nova Scotia in 1936.

Table 96.—Refined Lead Production in Canada,* 1927-1936

Year	Pounds of refined lead produced	Year	Pounds of refined lead produced
1927.....	295,766,327	1932.....	253,136,522
1928.....	301,067,819	1933.....	254,565,861
1929.....	304,449,673	1934.....	†314,457,735
1930.....	304,471,706	1935.....	†327,515,277
1931.....	278,448,457	1936.....	†363,449,490

* Includes the electrolytic lead produced from Canadian and foreign ores at Trail, B.C.; and also the pig lead from Galetta, Ont., until 1931. †Primary lead only.

Table 97.—Available Statistics on the Consumption of Lead in Specified Canadian Manufacturing Industries, 1935 and 1936

Industries	Items Used	1935	1936
		Pounds	Pounds
Brass and copper products.....	Pig lead.....	534,606	611,911
	Scrap and other lead.....	162,421	141,644
Paints and pigments.....	Pig lead.....	15,183,865	15,648,292
	Scrap lead.....	8,209,962	9,624,097
White metal alloys.....	Pig lead.....	11,924,180	11,654,207
	Scrap lead.....	17,329,633	18,753,513
Electrical apparatus.....	Scrap lead.....	108,732	160,456
	Lead sheets, etc.....	786,558	821,732
Iron and steel.....	Lead.....	1,096,432	1,150,749
Grand Total—Metal.....		55,334,389	58,566,601
	Red lead.....	632,816	848,518
	Litharge.....	1,291,625	1,128,075
Paints and Pigments.....	Basic carbonate white lead dry.....	2,709,809	3,697,698
	Basic carbonate white lead—in oil.....	1,300,585	1,573,852
Electrical apparatus.....	Basic sulphate white lead—sublimed.....	92,442	125,598
	Lead oxides (litharge and red lead).....	3,781,853	3,937,252

Table 98.—Imports into Canada and Exports of Lead, 1935 and 1936

	1935		1936	
	Pounds	Value	Pounds	Value
		\$		\$
IMPORTS—				
Old and scrap, pig and block.....	108,863	5,472	63,879	4,234
Bars and sheets.....	69,794	2,959	36,192	2,117
Litharge.....	1,750,400	100,689	1,968,600	124,001
Acetate of lead.....	216,600	16,504	128,569	8,637
Nitrate of lead.....	201,160	11,447	163,283	9,292
Other manufactures.....		70,988		79,823
Pipe lead.....	4,022	301	24,084	1,818
Shots and bullets.....	9,824	696	8,066	828
Tea lead.....	3,410	252		
Lead arsenate.....	324,328	26,388	223,300	20,096
Lead tetraethyl compounds of.....	2,381,734	1,249,477	3,019,356	1,414,720
Lead capsules for bottles.....		44,965		63,964
Lead pigments—				
Dry white lead.....	16,196	1,089	21,302	1,458
White lead, ground in oil.....	16,788	1,424	15,137	1,348
Dry red lead and orange mineral.....	595,584	35,392	847,859	55,353
Total.....		1,568,043		1,787,689
EXPORTS—				
Lead, contained in ore, etc.—				
To—United States.....	114,300	4,570	2,724,800	119,513
Belgium.....	11,182,300	285,081	5,676,200	154,431
Total lead in ore.....	11,305,100	289,955	9,395,500	287,569
Pig lead, refined lead, etc.—				
To United Kingdom.....	187,815,800	4,482,586	200,687,700	6,248,505
United States.....	1,800	98	1,300	76
Japan.....	69,257,200	1,751,691	98,560,300	3,140,296
France.....	7,611,300	178,887	5,878,500	182,159
Netherlands.....	672,100	23,099		
China.....	6,689,900	157,764	5,967,900	193,229
Brazil.....	3,456,900	95,766	6,471,400	224,247
Germany.....	10,800	350	595,700	18,999
Other countries.....	7,397,700	181,228	3,188,100	105,771
Total pig lead.....	282,913,500	6,871,469	321,350,900	10,113,282
Total Lead Exports.....	294,218,600	7,161,424	330,746,400	10,400,851

Table 99.—Monthly Average Prices of Pig Lead, Montreal,* New York and London,* 1934-1936

Month	Montreal (Value in cents per pound)			New York (Value in cents per pound)			London† (Value in pounds sterling per long ton)		
	1934	1935	1936	1934	1935	1936	1934	1935	1936
January.....	3-924	3-25	4-36	4-00	3-69	4-50	11-304	10-321	15-397
February.....	3-983	3-25	4-52	4-00	3-53	4-52	11-634	10-216	16-022
March.....	4-152	3-32	4-61	4-00	3-58	4-60	11-545	11-012	16-608
April.....	4-139	3-43	4-37	4-18	3-69	4-60	11-500	12-231	16-097
May.....	4-294	3-69	4-13	4-14	3-96	4-60	11-041	13-861	15-530
June.....	4-637	3-71	4-09	3-98	4-02	4-60	11-054	13-776	15-170
July.....	5-095	3-88	4-21	3-77	4-12	4-60	10-813	14-451	15-856
August.....	4-809	4-16	4-41	3-75	4-25	4-60	10-821	15-774	16-772
September.....	4-802	4-30	4-69	3-69	4-41	4-60	10-388	16-262	18-009
October.....	4-657	4-72	4-68	3-65	4-51	4-63	10-359	18-209	18-446
November.....	4-643	4-74	5-38	3-57	4-50	5-11	10-432	17-938	21-723
December.....	4-720	4-66	6-25	3-60	4-50	5-55	10-316	16-803	25-560
Average.....	4-488	3-93	4-64	3-86	4-06	4-71	10-935	14-238	17-599

*Producers' prices for car load quantities ex-cars, Montreal, as furnished by the Consolidated Mining and Smelting, Co. Ltd.

†From Engineering and Mining Journal.

‡The average price of lead for 1934, based on daily quotations in London and transposed to Canadian funds, was 2-4364 cents per pound; the average price of lead, based on the same market was 3-13318 cents for 1935 and 3-91277 cents in 1936.

Table 100.—World Production of Lead Ore, 1934-1936

(Supplied by Imperial Institute)

(In terms of metal—Long tons)

Producing country	1934	1935	1936	Producing country	1934	1935	1936
BRITISH EMPIRE				FOREIGN COUNTRIES			
United Kingdom.....	53,816	41,230	30,493	—Con.			
Nigeria.....	440	690	830	Roumania.....	4,238	4,890	3,600
Northern Rhodesia.....	(a)	5,867	7,080	Spain (smelter).....	71,011	61,751 (c)	40,000
Union of South Africa.....	71	5	6	Sweden.....	8,118	8,727	9,518
Canada (b).....	154,588	151,386	171,063	U.S.S.R. (Russia)			
Newfoundland.....	37,227	35,010	30,937	(smelter).....	26,722	36,000	50,000
Federated Malay States.....		23	2	Yugoslavia.....	69,062	67,000	73,600
India.....	88,800	89,400	90,900	Algeria.....	630	300	2,122
Australia.....	229,825	221,793	223,749	Morocco (French).....	192	118	6,000
Total.....	570,000	545,000	555,000	Tunis.....	5,100	5,546	9,600
FOREIGN COUNTRIES				Guatemala (estimated).....	30	40	40
Austria.....	5,183	5,498	5,846	Mexico (b).....	163,706	181,284	212,317
Bulgaria.....	452	505	60	United States (b).....	256,636	295,628	333,916
Czechoslovakia.....	3,428	3,786	3,881	Argentina.....	2,798	2,494	6,741
Finland.....	246	337	367	Bolivia (exports).....	11,023	9,588	14,288
France.....	876	3,287	3,100	Chile.....	109	101	(a)
Germany.....	57,995	59,701	67,524	Peru.....	8,959	28,094	(a)
Greece.....	14,900	6,200	3,465	China.....	3,900	4,000	4,000
Italy.....	19,217	21,600	30,000	French Indo-China.....	7		31
Norway.....	492	325	435	Japan (smelter).....	6,928	7,325	8,743
Poland.....	6,000	8,000	7,000	Korea (smelter).....	1,777	1,701	2,695
Portugal.....	3		3	Turkey.....	4,931	2,600	5,286
				Total.....	750,000	820,000	930,000
				World's Total.....	1,320,000	1,370,000	1,490,000

(a) Information not available.

(b) Amount estimated as recoverable.

(c) Estimated.

Table 101.—World Metal Production of Lead, 1934-1936

METAL PRODUCTION OF LEAD

(Supplied by Imperial Institute)

(Long tons)

Producing country	1934	1935	1936	Producing country	1934	1935	1936
BRITISH EMPIRE				FOREIGN COUNTRIES			
United Kingdom.....	9,000	22,000	13,600	Poland.....	10,187	18,522	14,784
Northern Rhodesia.....	184	182	300	Portugal.....	53		
Canada.....	140,383	146,212	162,254	Roumania.....	4,238	4,485	4,707
India.....	71,815	72,060	73,155	Spain.....	71,011	61,751	45,000
Australia (d).....	196,005	217,934	192,954	U.S.S.R. (Russia).....	26,722	36,000	50,000
Total.....	417,000	458,000	442,000	Yugoslavia.....	9,649	7,822	5,712
FOREIGN COUNTRIES				Tunis.....	26,880	24,989	20,715
Austria.....	5,540	7,921	8,594	Mexico.....	168,000	170,886	199,782
Belgium (b).....	73,569	67,891	65,942	United States.....	276,859	289,432	356,338
Czechoslovakia.....	4,002	4,729	4,740	Argentina.....	4,967	4,038	10,500
France.....	30,651	14,345	14,300	Peru.....	1,959	7,560	8,600
Germany (c).....	122,022	126,247	150,956	China.....	1,639		(a)
Greece.....	8,758	6,321	4,314	French Indo-China.....	15	18	12
Hungary.....	41	13	(a)	Japan.....	6,928	7,325	8,094
Italy.....	47,087	41,879	41,012	Korea.....	1,777	1,701	(a)
Norway.....	328	568	223	Total.....	900,000	900,000	1,010,000
				World's Total.....	1,320,000	1,360,000	1,450,000

(a) Information not available.

(b) Includes base bullion as follows:—

1934.....	7,972 long tons
1935.....	1,978 "

(c) Includes some secondary. Figures as published by *Metallgesellschaft*, which exclude secondary, are—

1934.....	118,000 long tons
1935.....	120,400 "
1936.....	136,800 "

(d) Includes base bullion as follows:—

1934.....	35,804 long tons
1935.....	36,723 "
1936.....	33,450 "

ZINC

Since the breakdown at the end of 1934 of the international zinc cartel, there has been a tendency for production in almost every country to increase. Negotiations continued from October, 1935, up to the middle of 1936 with the hope of reconstituting the cartel but at this time the outbreak of civil war in Spain added to the difficulties and discussion was abandoned. In general, however, the zinc position remains somewhat unsatisfactory compared with that of lead, a fact which must be attributed primarily to the fact that consumption has not expanded as fast as that of many other metals and primary commodities. Galvanizing still accounts for a high percentage of the total consumption and the recovery in brass consumption and the development of relatively new uses such as die casting has not been sufficient completely to offset the tendency for the consumption of galvanized goods to decline, or at any rate to show little increase.—(O. K. Roskill, *The Mining Journal*, London.)

Table 102.—Production of Zinc from Canadian Ores, by Provinces, 1927-1936

(For years 1898 to 1926, see 1928 report on the Mineral Production of Canada)

Year	Quebec		Manitoba		Saskatchewan		British Columbia		Canada	
	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value
		\$		\$		\$		\$		\$
1927.....	17,189,046	1,064,690					148,306,479	9,186,103	165,495,525	10,250,793
1928.....	21,057,760	1,156,745					163,530,890	8,983,079	184,647,374	10,143,050
1929.....	19,653,440	1,058,731					172,096,841	9,270,857	197,267,087	10,626,778
1930.....	9,754,160	351,150	3,882,141	139,757			250,479,310	9,017,255	267,643,505	9,635,166
1931.....			35,173,749	898,338			202,071,702	5,160,911	237,245,451	6,059,249
1932.....			41,736,600	1,004,016			130,546,958	3,140,438	172,283,558	4,144,454
1933.....			43,516,037	1,397,082	2,789,683	89,563	152,826,264	4,906,487	199,131,984	6,393,132
1934.....			47,264,342	1,438,538	2,162,938	65,831	249,152,403	7,583,202	298,579,683	9,087,571
1935.....	5,322,844	164,955	51,129,980	1,584,513	8,974,720	278,126	255,222,315	7,909,314	320,649,859	9,936,908
1936.....	6,896,123	228,606	36,744,951	1,218,095	27,692,869	918,019	255,668,574	8,475,413	333,182,736	11,045,007

Zinc-bearing ores were mined in Ontario prior to 1931; for production, see previous reports.
In 1936 Nova Scotia produced 6,180,219 pounds valued at \$204,574.

Table 103.—Refined Primary Zinc, Production in Canada, 1927-1936

Year	Short tons	Year	Short tons
1927.....	73,208	1932.....	86,141
1928.....	81,765	1933.....	91,946
1929.....	86,048	1934.....	134,917
1930.....	121,496	1935.....	149,523
1931.....	118,622	1936.....	151,103

NOTE.—For years 1916 to 1925, see previous reports.

Table 104.—Available Statistics on the Consumption of Zinc in Specified Canadian Manufacturing Industries, 1934 and 1936

Industry	Items used	1935	1936
		Pounds	Pounds
Brass and copper products.....	Other zinc.....	270,242	345,537
	Zinc ingots and slabs.....	4,164,656	4,922,432
	Zinc scrap.....	51,233	158,239
White metal alloys.....	Zinc spelter.....	1,528,054	2,091,999
	Zinc scrap.....	704,980	590,639
Electrical apparatus.....	Zinc ingots and bars.....	636,199	723,050
	Zinc sheets.....	2,193,910	2,452,853
Acids, alkalis and salts.....	Zinc and zinc ore.....	2,813,565	2,443,655
Iron and steel.....	Zinc.....	20,449,488	22,205,005
Miscellaneous chemicals.....	Zinc sheet.....	52,977	70,587
Grand Total—Metal.....		32,865,354	36,004,496
Paints and pigments.....	Zinc oxide.....	2,476,286	2,696,741
	Lead-zinc oxides and zinc leads.....	1,944,073	2,784,332
	Lithopone.....	11,601,125	13,477,057
Electrical apparatus.....	Zinc chloride.....	348,756	356,105
Toilet preparations.....	Zinc oxide.....	70,232	64,445
	Zinc stearate.....		17,285

Table 105.—Imports into Canada and Exports of Zinc, 1935 and 1936

	1935		1936	
	Pounds	Value	Pounds	Value
IMPORTS		\$		\$
Zinc dust.....	1,648,100	80,837	1,619,800	68,914
Zinc in blocks, pigs, bars and rods and zinc plates, n.o.p.....	18,100	2,111	11,400	1,238
Zinc in sheets and strips, and zinc plates for marine boilers.....	5,579,000	349,013	5,739,200	394,327
Zinc spelter.....	115,300	4,254		
Zinc white (zinc oxide).....	11,768,314	460,122	13,240,889	519,425
Zinc sulphate.....	2,042,284	29,459	832,886	12,530
Zinc, chloride of.....	1,869,056	55,942	1,933,034	60,724
Zinc, manufactures of, n.o.p.....		128,536		121,863
Lithopone.....	17,383,273	620,615	18,859,517	666,667
Total.....		1,730,889		1,845,988
EXPORTS				
Zinc, contained in ore—				
To Belgium.....	6,329,300	124,118	31,584,500	553,802
Japan.....	2,175,500	23,486	2,455,200	37,781
United Kingdom.....	2,935,700	48,750		
France.....	3,030,800	53,555	4,535,200	126,291
Germany.....	5,128,300	87,800	556,900	9,372
United States.....	600	23	200	7
Total.....	19,600,200	337,732	39,132,000	727,253

Table 105.—Imports into Canada and Exports of Zinc, 1935 and 1936—Concluded

	1935		1936	
	Pounds	Value	Pounds	Value
EXPORTS—Concluded				
		\$		\$
Zinc, scrap, dross and ashes—				
To United Kingdom.....	669,300	14,144	520,000	10,236
United States.....	210,000	2,480	176,300	1,661
Japan.....	3,385,000	21,851	2,879,800	32,435
Belgium.....	1,598,200	21,198	1,316,600	18,163
Total.....	6,267,500	63,719	5,007,100	63,875
Zinc, spelter—				
To United Kingdom.....	222,213,700	6,406,584	226,904,300	6,918,919
United States.....	1,246,400	36,130	4,602,900	144,729
British India.....	2,744,100	69,185	430,800	13,224
Chile.....	230,500	8,922	300,100	9,460
Belgium.....	9,427,200	264,996	4,929,800	139,656
Brazil.....	1,198,900	37,749	795,300	23,316
China.....	3,671,100	109,437	5,570,800	165,728
France.....	3,103,600	87,416	1,747,500	51,979
Germany.....	44,800	1,618	314,900	10,254
Italy.....	1,120,100	29,692		
Japan.....	25,436,900	745,229	34,351,800	1,029,521
Mexico.....	56,000	1,757	309,700	12,071
British South Africa.....	336,000	8,542	63,500	1,828
Total.....	270,918,800	7,809,691	280,422,900	8,523,906
Grand Total—Exports.....	296,786,500	8,211,142	324,562,000	9,315,034

Table 106.—Monthly Average Prices of Zinc at Montreal, St. Louis and London, 1934-1936

Month	Montreal ¹ (In cents per pound)			St. Louis ² (In cents per pound)			London ² (In pounds Sterling per long ton)		
	1934	1935	1936	1934	1935	1936	1934	1935	1936
January.....	4.750	3.65	4.221	4.271	3.730	4.848	14.688	11.994	14.488
February.....	4.658	3.64	4.400	4.384	3.714	4.859	14.844	11.819	15.125
March.....	4.498	3.64	4.548	4.368	3.894	4.900	14.735	12.095	15.983
April.....	4.367	3.69	4.235	4.370	4.030	4.900	14.916	12.891	15.181
May.....	4.174	3.94	3.980	4.346	4.220	4.900	14.722	14.534	14.536
June.....	4.010	3.82	3.886	4.240	4.299	4.880	14.241	13.734	13.896
July.....	3.850	3.91	3.796	4.317	4.325	4.783	13.466	14.065	13.579
August.....	3.824	4.08	3.807	4.281	4.535	4.800	13.682	14.714	13.528
September.....	3.700	4.22	3.891	4.049	4.669	4.850	12.644	15.414	13.906
October.....	3.580	4.47	3.914	3.832	4.825	4.850	12.217	16.440	14.554
November.....	3.627	4.49	4.388	3.732	4.850	4.974	12.000	16.193	16.301
December.....	3.665	4.36	4.768	3.711	4.850	5.273	11.730	15.091	17.957
Average.....	4.059	3.99	4.153	4.158	4.328	4.901	13.657	14.082	14.920

¹ Supplied by Consolidated Mining and Smelting Co., Montreal, Que.² From the Engineering and Mining Journal.

The London zinc price, on the basis of which the greater part of the Canadian production is sold, when converted to Canadian funds, averaged 3.0436 cents per pound in 1934; the corresponding figure for 1935 was 3.0989 cents and for 1936, it was 3.31501 cents.

Table 107.—World Production of Zinc, 1934-1936

(Supplied by the Imperial Institute)

PRODUCTION OF ZINC ORE

(In terms of metal) (Long tons)

Producing Country	1934	1935	1936	Producing Country	1934	1935	1936
BRITISH EMPIRE				FOREIGN COUNTRIES— Concluded			
United Kingdom.....	445	1,164	4,249	Spain.....	31,000	33,000	30,000
Northern Rhodesia.....	(d) 19,540	26,902	26,155	Sweden.....	28,664	31,184	33,747
Canada (shipments) (b).....	141,396	147,772	159,640	U.S.S.R. (Russia)			
Newfoundland.....	86,758	71,151	63,354	(smelter).....	26,722	45,000	65,000
India.....	54,800	58,200	61,300	Yugoslavia.....	52,967	52,000	59,300
Australia.....	136,760	148,492	172,414	Algeria.....	2,336	3,174	2,827
Total.....	440,000	454,000	487,000	Belgian Congo.....			376
FOREIGN COUNTRIES				French Morocco.....			422
Austria.....	2,541	2,591	3,197	Tunis.....		200	1,000
Bulgaria.....	251	280		Mexico.....	123,209	133,775	147,878
Belgium (c).....	1,000	500	500	United States.....	391,720	462,413	516,204
Czechoslovakia.....	965	1,549	1,342	Bolivia (exports).....	9,338	7,663	13,403
Finland.....	1,000	1,008	1,081	Peru.....	7,823	10,918	(a)
Germany.....	129,650	138,696	154,038	China.....	5,100	(a)	(a)
Greece.....	5,821	982	3,432	French Indo-China.....	4,881	4,966	5,139
Italy.....	45,373	53,000	62,000	Japan (b).....	20,000	20,000	18,000
Norway.....	5,551	6,597	7,583	Korea (ore).....	2,883	2,183	5,483
Poland.....	40,000	53,000	58,000	Turkey.....	7,100	7,200	10,200
Portugal.....	18		4	Argentina.....			2,916
Roumania.....	3,511	4,002	4,800	Total.....	950,000	1,050,000	1,210,000
				Worlds Total.....	1,390,000	1,530,000	1,710,000

(a) Information not available.

(b) The amount estimated as recoverable was—

1934.....133,295 long tons.

1935.....143,147 "

1936.....148,742 "

(c) *Metalgesellschaft* estimate.

(d) Smelter production.

Table 108.—World Metal Production of Zinc, 1934-1936

(Supplied by the Imperial Institute)

(Long tons)

Producing Country	1934	1935	1936	Producing Country	1934	1935	1936
BRITISH EMPIRE				FOREIGN COUNTRIES— Concluded			
United Kingdom (b)....	54,000	63,000	65,000	Netherlands.....	19,597	13,530	15,184
Northern Rhodesia.....	19,540	20,680	21,730	Norway.....	44,316	44,308	44,317
Canada.....	120,462	133,503	134,913	Poland.....	91,453	83,270	91,118
Australia.....	54,629	67,666	70,509	Spain.....	8,052	8,775	7,700
Total.....	249,000	285,000	291,000	U.S.S.R. (Russia).....	26,722	45,000	65,000
FOREIGN COUNTRIES				Yugoslavia.....	(d) 4,299	(d) 3,302	3,542
Belgium.....	172,138	178,870	198,504	Mexico.....	28,568	31,632	31,702
Czechoslovakia.....	7,513	9,511	7,598	United States (c).....	324,634	375,566	439,404
France.....	46,502	46,694	53,000	China.....	134	(a)	(a)
Germany.....	70,072	121,252	131,647	French Indo-China.....	4,174	3,842	4,047
Italy.....	24,471	27,143	27,041	Japan.....	31,638	33,651	38,449
				Total.....	900,000	1,030,000	1,160,000
				Worlds' Total.....	1,150,000	1,310,000	1,450,000

(a) Information not available.

(b) Includes some secondary.

(c) The production by grades (including redistilled secondary) was as follows (long tons):—

	1934	1935	1936
A—High grade.....	104,214	138,854	164,144
B—Intermediate grade.....	29,126	43,855	53,463
C & D—Select and brass special.....	38,979	44,562	58,686
E—Prime western.....	169,896	173,876	200,797

(d) Including zinc dust.

CHAPTER FOUR

THE NICKEL-COPPER INDUSTRY IN CANADA

1. Definition of the Industry.
2. General Review.
3. Commodity statistics, including tables showing production by provinces, imports, exports, prices and world output of nickel, copper and metals of the platinum group.

1. Definition of the Industry.

The nickel-copper industry in Canada includes the mining, smelting and, to a certain extent, the refining of the nickel-copper ores of the Sudbury district in the province of Ontario. Smelting and copper refining operations are carried on in close proximity to the mines; nickel refining is conducted at Port Colborne, Ontario. Matte is exported for treatment in plants at Huntington, West Virginia, U.S.A., Kristiansand, Norway, and Clydach, Wales.

As thus described, the industry in Canada constitutes the national source of nickel, most of the platinum group metals and a large part of the Canadian copper production. Gold, silver, tellurium and selenium in increasing quantities are also recovered from these ores.

Mines in the copper-gold-silver group also contribute largely to the total Dominion copper output; ores from these properties contain, in the aggregate, about 13 per cent of the annual gold production. The activities of the copper-gold mines are reviewed in the chapter on the gold mining industry. Production and trade statistics on nickel, copper and the metals of the platinum group are given in this chapter.

2. General Review.

In 1936 a new all-time high record in Canadian nickel production was established for the third successive year. Finally revised statistics show an output during the year under review of 169,739,393 pounds valued at \$43,876,525 as compared with 138,516,240 pounds worth \$35,345,-103 in 1935. Production as recorded came entirely from the province of Ontario and included the nickel in matte exported, metal electrolytically refined at Port Colborne, Ontario, and the nickel contained in oxides and salts produced in Canadian metallurgical plants.

Practically all of the nickel produced in Canada is derived from the copper-nickel bearing deposits of the Sudbury district, Ontario. Two companies operate mines and metallurgical plants in this area. The International Nickel Company of Canada, Limited, conducts smelting operations at Copper Cliff and Coniston, Ontario, while the Falconbridge Nickel Mines, Ltd., smelt their ores at the Falconbridge mine located a few miles east of the town of Sudbury. This last named company treat their matte in a refinery located at Kristiansand, Norway. The relatively small amount of nickel oxide produced at Deloro, Ontario, is recovered from silver-cobalt-nickel-arsenic ores mined in Northern Ontario. Smelter matte made by the International Nickel Company is treated in plants located at Clydach, Wales; Huntington, West Virginia, and at Port Colborne and Copper Cliff, Ontario. Nickel-copper matte was also made and exported during 1936 by Cuniptau Mines Ltd.; this company operated a mine and smelter near Goward in the Temagami district of Northern Ontario. In British Columbia a relatively small tonnage of crude nickel ore was mined for export by the B.C. Nickel Mines, Ltd.

The first major discovery of nickel-copper ores (Murray mine) in the Sudbury district was reported in 1883; the following year witnessed the discovery of the now famous Frood deposit and the first Canadian smelter to treat copper-nickel ores was blown in at Copper Cliff, Ontario, in 1888. Since these early years the development of the industry has been truly remarkable, for to-day Canada produces from Sudbury ores approximately 88 per cent of the world's nickel, 49 per cent of its platinum metals, and 8 per cent of the copper.

The relative status of the nickel-copper mining, smelting and refining industry as an economic factor of increasing importance in the development of our mineral resources is distinctly reflected in the mineral production statistics of the past decade. In 1926 the value of Canadian nickel output was \$14,374,163, or 5.9 per cent of that of the entire Canadian mining industry, by 1936 Canadian nickel production had increased in value to \$43,876,525 and its percentage of the total value of our national mineral output had risen to 12.1. Copper recovered from Sudbury ores in 1936 totalled some 287,914,000 pounds or 68.4 per cent of the entire Canadian copper production whereas in 1926 production from this source amounted to only 40,905,171 pounds or 30.7 per cent of the Dominion copper output.

In addition to production of nickel, copper and the platinum metals there is an increasing output from these ores of the associated metals—silver, gold, selenium and tellurium; sulphur for the manufacture of sulphuric acid is also recovered in the gaseous state from waste smelter gases. The total gross value of the various products of the Canadian industry, considered as a whole, was estimated at \$77,593,731 in 1936 compared with a corresponding value of \$58,996,451 in the preceding year. It is also interesting to note that silver recovered from the Sudbury nickel-copper ores totalled 2,484,568 fine ounces in 1936, a recovery that was some 240,000 ounces in excess of the total silver produced in 1936 from silver-cobalt ores mined in the noted Cobalt and Gowganda camps; silver recovered from nickel-copper ores during 1936 amounted to 13.6 per cent of the total silver produced by the entire Canadian mining industry. Gold recovered from Canadian nickel-copper ores totalled 73,377 fine ounces in 1936 or 1.95 per cent of that produced by all Canadian mines; in 1926 the corresponding percentage of this metal recorded as being recovered from this source was less than half of one per cent.

Employees in the industry in 1936 totalled 8,762 and salaries and wages paid amounted to \$13,659,972 as compared with 7,009 employees and \$11,275,650 and 3,291 employees and \$4,853,978 in 1935 and 1926, respectively; the data for 1936 represent an increase over 1926 of 166 per cent in number of employees and 181 per cent in salaries and wages. The combined value of fuel and purchased electricity consumed in 1936 totalled \$5,679,676 while explosives, chemicals and various other process supplies used were evaluated at \$8,669,422.

Canadian exports of nickel in all forms in 1936 totalled 173,637,500 pounds valued at \$44,594,296 as compared with 142,726,500 pounds worth \$36,285,482 in 1935; of the 1936 exports, 50,273,800 pounds were consigned to the United Kingdom and 94,231,000 pounds to the United States.

The International Nickel Company of Canada, Limited, reported in February, 1937: "Ore requirements in 1936 of 4,299,329 tons were extracted from the Frood and Creighton mines, which were operated continuously throughout the year; the former furnished 3,408,956 tons and the latter, 890,373 tons. Development work at the Frood mine was carried on in step with production requirements. The footage advance was 30,628 feet, thus bringing the total underground workings to approximately 50 miles. There are now sufficient stopes in operation, or in readiness, to yield a daily output of 13,000 tons. In the Creighton mine development work was adjusted to ore requirements. An advance of 8,656 feet was made and the total footage of development is now about 45 miles. The new shaft and surface plant have been completed; the shaft is 4,075 feet deep and will be used in extracting a substantial tonnage of ore from recently developed reserves. There were milled and concentrated 3,317,988 tons of ore; the plant can now treat 11,000 tons of ore per day, an increase of one-third over its former capacity. The Copper Cliff smelter produced 149,000 tons of bessemer matte and 139,796 tons of blister copper; this plant was extended during the year and two reverberatory furnaces and seven converters installed, thus bringing the total smelter equipment to seven reverberatory furnaces and nineteen converters; these additional facilities increase productive capacity by one-third. At the Coniston smelter the four blast furnaces and five converters were operated throughout the year; ore to the amount of 834,314 tons was processed and 56,827 tons of bessemer matte produced. The Port Colborne refinery (Ontario) operated at capacity throughout 1936 and produced 103,860,757 pounds of nickel; an addition to this plant, which increased capacity by 50 per cent, was completed during 1936.

"In Wales (The Mond Nickel Company Ltd.) the output, at the Clydach nickel refinery, of nickel in the form of pellets was 36,303,494 pounds comparable with 28,579,015 pounds in the previous year. In addition 2,561,722 pounds of metal were absorbed in the production of 12,229,-

332 pounds of nickel salts; during the year the production capacity was increased to 42,000,000 pounds of metallic nickel per annum, and extensions to the pressure plant will eventually bring the capacity to 50,000,000 pounds.

"In conformity with the increased output of the copper and nickel refineries the output of the Acton, England, refinery (Mond Nickel Co. Ltd.) increased by 22 per cent over 1935 and reached a record level at 232,343 ounces of platinum metals and 10,210 ounces of gold.

"To effect further economies in operation certain existing equipment was modernized and relocated in the Huntington plant (International Nickel Co. Inc.), West Virginia, U.S.A.; there was added another 25 ton open hearth furnace, and various new machine tools and items of finishing equipment were installed.

"The total number of employees of the International Nickel and associated companies at the end of 1936 was 15,433 distributed as follows:—Canada, 9,837; Great Britain, 3,124; United States, 2,417; other countries, 55. Employees on December 31, 1935, numbered 12,452.

"The proven ore reserves of the International Nickel Company of Canada, Ltd., at December 31, 1936, were reported by that company at 205,482,000 tons; additional ore proven during 1936 amounted to 4,381,000 tons."

Falconbridge Nickel Mines Ltd. reported: "The ore dressing plant, mill and smelter were extended during the year to take care of a 25 per cent increase in production. In connection with the new shaft there was built a new ore dressing plant containing some new features for preparing and grading the ore for further steps in the mill and smelter; handsorting is practically done away with; the new plant will permit treatment of lower grade ore.

"Mine development replaced the tonnage of ore extracted during the year, and in addition disclosed over one million tons more, so that ore reserves now stand at over five million tons (averaging 1.81% nickel and 0.88% copper). It also showed ore-existence at 1,750 feet in depth, or over 500 feet deeper than the lower horizon at which present ore-extraction is being carried out. Work in 1937 is scheduled to develop this deeper level, as also to sink the No. 1 shaft to 2,200 feet depth, and investigate the ore-occurrence at that horizon. . . . The refinery (Norway) was extended during the year for ample capacity to handle the 25 per cent increase in smelter capacity. . . . At Falconbridge 327,783 tons of ore were treated during 1936, of which 126,782 tons were milling ore and 201,101 tons were smelting ore; 10,244.2 short tons of matte were produced containing 5,682.5 short tons of nickel and 2,644.4 short tons of copper."

A rather interesting feature of the industry in 1936 was the shipment of a relatively small tonnage of nickel ore from the old Alexo nickel mine; this was made by Cuniptau Mines Ltd. and was in the nature of a sample; the property is located near Porquis Junction, Ontario.

During 1937 considerable work of an exploratory nature was conducted underground at the Denison nickel property located at Worthington in the Sudbury district.

In British Columbia steady development work was carried on throughout 1936 by B.C. Nickel Mines Ltd.; operations at the mine, located at Choate, were conducted both underground and on the surface. The annual report for 1936 as issued by the B.C. Department of Mines contains the following information relating to this property: "No. 1 tunnel, which is about 4,700 feet long, extends through the mountain. The entrance is on the Texas Creek side and the exit on the Emory Creek side. There are four crosscuts off this tunnel on the north side and two on the south side. Six raises have been put up from these crosscuts, averaging from 150 to 350 feet. Extensive diamond-drilling has also been carried out. During 1936 approximately 2,000 tons of ore has been shipped to Japan, all of this being stoped from the 1,600 crosscut." In the same province the Western Nickel Corp. Ltd. reported that prospecting operations were conducted near Yale from May to September inclusive.

A report issued by the Bureau of Mines, Ottawa, states that interesting and possibly important discoveries of nickel-copper deposits, apparently similar in composition to those of Sudbury, were made during 1936, one near Dryberry Lake, about 40 miles southeast of Kenora in the Lake of the Woods District, Ontario; another at Dinty Lake, about 23 miles northeast of Lake Athabaska, in northern Saskatchewan.

Table 109.—Principal Statistics of the Nickel-Copper Mining, Smelting and Refining Industry in Canada, 1934-1936 (*)

	1934	1935	1936
Number of firms.....	4	4	5
Number of mines.....	7	7	9
Number of smelters.....	3	3	4
Number of refineries.....	1	1	1
Capital employed.....	\$ 88,574,427	87,015,617	97,838,133
Number of employees—On salary.....	223	245	293
On wages.....	5,394	6,764	8,469
Total	5,617	7,009	8,762
Salaries and wages—Salaries.....	\$ 740,191	800,700	922,545
Wages.....	\$ 8,124,581	10,474,950	12,737,427
Total	\$ 8,864,772	11,275,650	13,659,972
Fuel and purchased electricity used (c).....	\$ 4,202,810	4,735,768	5,679,676
Process supplies used (b).....	\$ (a) 7,181,698	7,181,698	8,669,422
Estimated gross value of matte exported and Canadian refinery products.....	\$ 52,906,920	58,996,451	77,593,731
Value of production less items (b) and (c).....	\$ (a) 47,078,985	47,078,985	63,244,633

(*) Does not include data for copper refineries.

(a) Information not available.

Table 110.—Output from Canadian Nickel-Copper Mines and Smelters, 1932-1936
(short tons)

	1933	1934	1935	1936
Oreshipped from mines.....	1,533,887	2,903,310	3,608,437	4,634,434
Ore and concentrates treated.....	1,523,814	2,896,959	3,616,223	4,620,183
Blister copper produced in Ontario (a).....	60,398	95,826	119,720	137,369
Nickel produced in Ontario (b).....	20,748	35,487	40,191	51,952
Matte exported (c).....	43,315	46,755	46,371	50,644
Nickel content of matte exported.....	25,811	28,771	28,949	32,767
Copper content of matte exported.....	12,323	6,692	6,272	6,496

In addition to the total recorded for 1936 a relatively small tonnage of nickel-bearing ore was exported from a property located in British Columbia.

(a) Copper content.

(b) Includes nickel content of salts and oxides produced.

(c) Less a relatively small tonnage of matte returned annually to Canada for retreatment since 1934.

Table 111.—Proportion of Nickel and Copper in Sudbury Matte, 1927-1936

Year	Percentage			Year	Percentage		
	Nickel	Copper	Total		Nickel	Copper	Total
1927.....	48.4	31.7	80.1	1932.....	40.7	38.4	79.1
1928.....	47.6	32.6	80.2	1933.....	44.7	31.6	76.3
1929.....	44.0	35.1	79.1	1934.....	44.4	32.9	77.3
1930.....	38.6	42.5	79.1	1935.....	44.9	31.8	76.7
1931.....	40.5	38.7	79.2	1936.....	44.0	31.6	75.6

Table 112.—Employees, Salaries and Wages, in the Nickel-Copper Mining, Smelting and Refining Industry in Canada, 1936

	1936						
	On salary		Mine		Mill	Total	Salaries and wages
			Surface	Under-ground			
	Male	Female					\$
Salaried employees—							
Mine and mill.....	89	3				92	237,287
Smelters and refinery.....	158	43				201	685,258
Total	247	46				293	922,545
Wage-earners—							
Mine and mill.....			749	3,362	203	4,314	7,094,255
Smelters and refinery.....			4,155			4,155	5,643,172
Total			4,904	3,362	203	8,469	12,737,427
Grand Total	247	46	4,904	3,362	203	8,762	13,659,972

Table 113.—Number of Wage-Earners Employed, by Months, 1931-1936

Month	1931	1932	1933	1934	1935	1936
January.....	4,726	3,014	1,822	4,811	5,666	8,076
February.....	4,656	3,019	1,957	4,876	5,804	8,044
March.....	4,641	3,039	2,036	5,048	6,077	8,103
April.....	4,620	2,577	1,976	5,189	6,277	8,191
May.....	4,597	2,379	2,034	5,409	6,446	8,257
June.....	4,422	2,434	3,001	5,622	6,573	8,411
July.....	4,324	2,235	3,957	5,658	6,733	8,653
August.....	4,262	1,672	4,523	5,566	7,253	8,604
September.....	3,657	1,628	4,775	5,500	7,500	8,606
October.....	3,068	1,580	5,050	5,722	7,714	8,700
November.....	3,195	1,490	4,968	5,707	7,632	8,735
December.....	3,094	1,551	4,762	5,609	7,489	9,050

NICKEL

Production figures include nickel in matte or speiss exported from the Canadian smelters valued at 18 cents per pound; refined and electrolytic nickel produced in Canada, valued at the average price received for sales of nickel metal from the refinery during the year, and the nickel equivalent in oxides or salts produced, valued in the aggregate at the price obtained from the sales of oxides or salts.

Table 114.—Production of Nickel from Canadian Ores, 1925-1936

(For years 1889 to 1924 see report on the Mineral Production of Canada, 1928)

Year	Pounds of nickel	Value	Year	Pounds of nickel	Value
		\$			\$
1925.....	73,857,114	15,946,672	1931.....	65,666,320	15,267,453
1926.....	65,714,294	14,374,163	1932.....	30,327,968	7,179,862
1927.....	66,798,717	15,262,171	1933.....	83,264,658	20,130,480
1928.....	96,755,578	22,318,907	1934.....	128,687,340	32,139,425
1929.....	110,275,912	27,115,461	1935.....	138,516,240	35,345,103
1930.....	103,768,857	24,455,123	1936.....	169,739,393	43,876,525

Table 115.—Production(*) in Canada, Imports and Exports of Nickel, 1935 and 1936

	1935		1936	
	Pounds	Value	Pounds	Value
PRODUCTION—		\$		\$
Nickel in matte or residues exported (a) refined and electrolytic nickel produced; and nickel in oxides and salts sold.....	138,516,240	35,345,103	169,739,393	43,876,525
EXPORTS—				
Nickel, fine; nickel contained in ore, matte or speiss and nickel contained in oxide.....	142,726,500	36,285,482	173,637,500	44,594,296
To United Kingdom.....	49,184,600	12,572,741	50,273,800	14,115,970
United States.....	66,803,700	16,117,522	94,231,000	22,553,514
IMPORTS (specified)—				
Nickel in bars or rods (not for anodes) and nickel in strips, sheets and plates.....	445,112	191,330	769,061	300,141
Nickel chromium in bars or rods (60+ per cent Ni)—75 inch diam. for electric resistance strip.....	43,434	41,381	52,825	51,170
Nickel, nickel silver and German silver in ingots or blocks, n.o.p.....	3,643	959	10,008	2,603
Nickel-plated ware, n.o.p.....		814,456		665,649
Nickel silver and German silver in bars, rods, sheets, plates or anodes.....	79,978	19,615	101,585	27,920
Nickel, German, Nevada silver, manufactures of, not plated.....		127,831		126,081
Nickel-plated household hollowware.....		3,736		2,212
Nickel, kitchen or household hollowware.....		149		1,473
Total nickel and its products.....		1,199,457		1,177,249

*Production entirely from Ontario; in addition to the production shown a relatively small tonnage of crude nickel ore was exported during 1936 from a nickel property being developed in British Columbia.

(a) Nickel in matte exported valued at 18 cents per pound.

Table 116.—World Production of Nickel Ore, 1934-1936

(In terms of metal)
(Supplied by the *Imperial Institute*)
(Long tons)

Producing country	1934	1935	1936
BRITISH EMPIRE			
Southern Rhodesia.....		12	14
Canada.....	57,450	61,838	75,777
India (b).....	1,209	1,465	1,292
Total.....	58,700	63,300	77,100
FOREIGN COUNTRIES			
Germany.....	(a)	268	(a)
Greece (e).....	1,046	1,091	1,235
Norway.....	1,312	1,216	1,251
U.S.S.R. (Russia).....	849	1,800	(a)
Morocco (French).....		205	146
United States (d).....	140	143	96
Brazil.....	38	5	470
New Caledonia (c).....	8,500	8,100	4,820
Total.....	11,900	12,800	10,100
World's total.....	70,600	76,100	87,200

(a) Information not available.

(b) Nickel content of speiss obtained as a by-product in smelting operations.

(c) Estimated content of matte and ferro-nickel obtained at smelters was as follows:—

1934.....	5,000 long tons
1935.....	6,000 "
1936.....	4,650 "

(d) Nickel content of salts and nickel produced as a by-product in the electrolytic refining of copper (partly from imported blister copper).

Secondary metal was recovered in the United States as follows:—

1934.....	1,650 long tons
1935.....	1,750 "
1936.....	1,754 "

(e) Figures represent combined totals of nickel content and cobalt content of ores.

NICKEL CONTAINED IN PRINCIPAL NICKEL ALLOYS

(Supplied by the International Nickel Company of Canada, Limited)

As guide to the part which nickel has in the industrial world through the alloys now being used in industry, the nickel content of the best known alloys is shown in the following table:—

NON-FERROUS ALLOYS—		Per cent Nickel
Malleable Nickel.....	99	
Monel Metal.....	67	
Inconel.....	80	
Heat Resistant Alloys (including Ferrous).....	35-85	
Cupro-Nickel Alloys	15-50	
Nickel Silvers.....	10-30	
Nickel Brasses and Bronzes.....	$\frac{1}{2}$ -5	
FERROUS ALLOYS—		
Nickel Steels.....	$\frac{1}{2}$ -7	
Stainless Steels (Nickel-Chromium).....	7-35	
Non-Magnetic Steels.....	10-25	
Invar Type Steels.....	32-45	
Nickel Wrought Iron.....	3	
Nickel Cast Irons.....	$\frac{1}{2}$ -5	
Ni-Resist Types.....	14-20	
Ni-Hard.....	4-6	
Ni-Tensyliron.....	1-2 $\frac{1}{2}$	

The heat resisting alloys are practically all of a nickel-chromium-iron combination with small additions of other elements which impart special characteristics depending upon the type of application. There is a large number of these alloys, in which the nickel ranges from 10 to 80 per cent, which may be divided into the following types:—

Type	Nickel	Chromium
1.....	60-80	15-20
2.....	25-40	15-20
3.....	20-25	20-30
4.....	10-20	20-30

The transportation industry is still the largest consumer of nickel alloy steel. There is a definite trend toward the use of nickel alloy steels for railroads, in ships, for road building and excavating equipment and in large power machinery, machine tools and agricultural equipment. The use of stainless steel throughout the world has increased steadily; an outstanding application of stainless steel for building light weight stream-line railroad equipment has grown and the use of stainless steel has also spread to the construction of airplanes.

During 1936 there were 262 long tons of nickel valued at \$136,715 consumed in Canada in the manufacture of alloy steels.

COPPER

Production of copper in Canada during 1936 and including the metal content of blister and anode copper produced in Canadian smelters, together with the metal contained in ores, matte, and concentrates exported, totalled 421,027,732 pounds valued at \$39,514,101. The quantity produced in 1936 established a new all-time high record for copper output in the Dominion and the value was surpassed only by that of 1929. During the year under review copper bearing ores were mined in Nova Scotia, Quebec, Ontario, Manitoba, Saskatchewan, and British Columbia. Of the total copper output in 1937 the nickel-copper ores of the Sudbury district in Ontario contributed 287,914,078 pounds or 68 per cent. World mine production of copper during 1936 totalled 1,680,000 long tons compared with 1,470,000 long tons in 1935; of the 1936 output the British Empire produced 420,000 long tons. Canada, as a world producer of copper, ranked third in 1936, being surpassed in the order of output by only the United States and Chile. Transposed into Canadian funds the average price of copper, based on the London market, was 9.4769 cents per pound in 1936 compared with 7.7954 cents per pound in 1935.

Table 117.—Production of Copper from Canadian Ores, 1927-1936

NOTE.—For years 1886 to 1926, see previous reports.

Year	Pounds	Value	Year	Pounds	Value
		\$			\$
1927.....	140,147,440	17,195,487	1932.....	247,679,070	15,294,058
1928.....	202,696,046	28,598,249	1923.....	299,982,448	21,634,853
1929.....	248,120,760	43,415,251	1934.....	364,761,062	26,671,438
1930.....	303,478,356	37,948,359	1935.....	418,997,700	32,311,960
1931.....	292,304,390	24,114,065	1936.....	421,027,732	39,514,101

Table 118.—Copper Production in Canada, by Provinces and by Sources, 1935 and 1936

	1935		1936	
	Pounds	Value	Pounds	Value
		\$		\$
PRODUCTION (new copper)—				
By Provinces—				
Nova Scotia.....			779,307	73,855
Quebec.....	79,050,906	6,162,350	66,340,175	6,287,058
Ontario.....	252,027,928	19,295,965	287,914,078	26,898,920
Manitoba.....	38,011,371	2,963,146	29,853,220	2,829,190
Saskatchewan.....	11,429,452	890,974	14,971,609	1,418,859
British Columbia.....	38,478,043	2,999,525	21,169,343	2,006,219
Total.....	418,997,700	32,311,960	421,027,732	39,514,101
By Sources—				
In blister and anode copper produced.....	386,840,587	30,155,849	382,310,369	36,231,553
In ore, concentrates and copper matte exported.....	19,612,674	1,528,889	13,894,160	930,053
In nickel-copper matte exported.....	12,544,439	627,222	24,823,203	2,352,495
Total.....	418,997,700	32,311,960	421,027,732	39,514,101

Table 119.—Production of Refined Copper in Canada, 1927-1936

NOTE.—For years 1916 to 1926 see previous reports.

Year	Tons	Year	Tons
1927.....	9,191	1932.....	90,077
1928.....	8,806	1933.....	112,245
1929.....	3,518	1934.....	149,261
1930.....	31,377	1935.....	173,290
1931.....	92,183	1936.....	191,595

The annual capacity of Canadian electrolytic copper refineries in 1936 was 195,000 short tons of refined copper (Ontario Refining Co. Ltd. 120,000 tons; Canadian Copper Refiners Ltd., 75,000 tons).

Table 120.—Production of Copper Sulphate in Canada, 1927-1936

Year	Pounds	Year	Pounds
1927.....	566,825	1932.....	*900,220
1928.....	771,400	1933.....	*629,100
1929.....	617,430	1934.....	*733,720
1930.....	734,300	1935.....	*642,746
1931.....	62,140	1936.....	*644,550

*Used by producer in metallurgical plants.

Table 121.—Quantity and Value of Copper Produced in Canada, by Provinces, 1927-1936

(For production in previous years see Mineral Production of Canada, 1928)

Year	Quebec		Ontario	
	lb.	\$	lb.	\$
1927.....	3,119,848	403,084	45,341,295	4,946,533
1928.....	33,697,949	4,909,791	66,607,510	8,770,149
1929.....	55,337,169	10,019,901	88,879,853	14,622,572
1930.....	80,310,363	10,425,891	127,718,871	15,187,259
1931.....	68,376,985	5,723,154	112,882,625	9,096,463
1932.....	67,336,692	4,296,216	77,055,413	4,407,928
1933.....	69,943,882	5,214,177	145,504,720	10,118,847
1934.....	73,968,545	5,487,948	205,059,539	14,822,704
1935.....	79,050,906	6,162,350	252,027,928	19,295,965
1936.....	66,340,175	6,287,058	287,914,078	26,898,920

Year	Manitoba		Saskatchewan†	
	lb.	\$	lb.	\$
1927.....				
1928.....				
1929.....				
1930.....	2,087,609	215,018		
1931.....	45,821,432	3,835,254		
1932.....	52,706,861	3,362,803		
1933.....	38,163,181	2,844,989	3,223,941	240,338
1934.....	30,867,141	2,290,126	6,618,913	491,077
1935.....	38,011,371	2,963,146	11,429,452	890,974
1936.....	29,853,220	2,829,190	14,971,609	1,418,859

Year	British Columbia		Yukon	
	lb.	\$	lb.	\$
1927.....	91,686,297	11,845,870		
1928.....	102,283,210	14,902,664	*107,377	15,645
1929.....	103,903,738	18,772,778		
1930.....	93,318,885	12,114,657	42,628	5,534
1931.....	65,223,348	5,459,194		
1932.....	50,580,104	3,227,111		
1933.....	43,146,724	3,216,502		
1934.....	48,246,924	3,579,583		
1935.....	38,478,043	2,999,525		
1936.....	21,169,343	2,006,219		

*Includes small quantities produced in 1925, 1926 and 1927, but not reported until 1928.

†The metal is recovered from that part of the Flin Flon mine situated on the Saskatchewan side of the Manitoba-Saskatchewan border.

NOTE:—Not included in the above table were 779,307 pounds of copper valued at \$73,855 produced in Nova Scotia in 1936.

Table 122.—Available Statistics on the Consumption of Copper in Specified Canadian Industries, 1935 and 1936

Industries	Item (Used)	1935	1936
Brass and copper products (a)	Ingots, wire bars, cakes, slabs, etc. lb.	75,018,643	99,560,824
	Scrap..... lb.	3,256,426	5,574,612
	Other bars and rods..... lb.	15,127	42,556
	Pipe and tubing..... lb.	45,177	39,888
	Plates and sheets..... lb.	497,964	640,597
	Wire..... lb.	379,889	196,768
	Castings..... lb.	1,663	4,679
White metal alloys	Other..... lb.	75,060	71,062
	Scrap..... lb.	1,571,355	1,831,095
	Copper bars, sheets, etc..... lb.	130,404	57,378
Electrical apparatus and supplies	Castings..... lb.	62,212	99,137
	Bars and rods..... lb.	22,374,396	25,702,675
	Scrap..... lb.	62,743	51,964
	Tubing and pipe..... lb.	434,131	655,102
	Sheets and plates..... lb.	235,944	304,733
	Wire, bare..... lb.	3,544,916	3,956,581
	Wire, enamelled..... \$	255,760	369,796
Iron and steel and their products	Wire, other insulated..... \$	422,431	637,391
	Copper sheets, bars, etc..... lb.	5,920,923	7,609,363

(a) A relatively large part of the copper included under this industry is rolled into wire rods, which are sold to manufacturers of electrical cable and duplication to this extent results from the inclusion of these rods in the electrical apparatus industry.

Table 123.—Imports into Canada and Exports of Copper, 1935 and 1936

	1935		1936	
	Pounds	Value	Pounds	Value
IMPORTS—		\$		\$
Copper in bars or rods, when imported by manufacturers of trolley, telegraph and telephone wires and electric cables for use only in the manufacture of such articles in their own factories.....	611,500	72,117	742,400	93,489
Copper bars, for use only in the manufacture of rods to be used exclusively in the manufacture of electrical conductors, and copper rods for such manufacture, individual units of conductors not to exceed area of No. 7-0 gauge conductor.....	6,600	700	18,700	1,858
Copper in bars or rods, in lengths of not less than 6 feet, unmanufactured.....	120,800	20,435	165,500	30,723
Copper in blocks, pigs or ingots.....	37,200	3,719	189,300	19,858
Copper, scrap, cathode plates, etc.....	16,300	1,416	7,000	316
Copper in strips, sheets or plates not polished or coated.....	324,300	60,044	378,700	71,262
Copper tubing in lengths of not less than 6 feet, and not polished, bent or otherwise manufactured.....	362,778	81,193	431,244	106,253
Copper wire.....	16,271	3,566	21,055	5,017
Copper wire cloth, or woven wire of copper.....		3,242		6,263
Copper, manufactures of, n.o.p.....		352,961		388,399
Copper, precipitate of, crude.....	4,420	486		
Anodes of nickel, zinc, copper, silver or gold.....				6,384
Copper, sub-acetate of, or verdigris, dry.....	6,613	1,062	7,015	1,212
Copper, sulphate of (blue vitriol).....	5,518,899	161,092	4,542,122	149,889
Copper rollers adapted for use in calico printing.....		71,836		78,621
Copper, sulphate of, dehydrated, for agricultural or spraying purposes.....	32,100	2,747	7,000	593
Total.....		836,616		960,127
EXPORTS—				
Copper, fine, contained in ore, matte, regulus, etc.....	38,702,700	1,870,542	45,519,600	2,971,042
Copper, blister.....	73,356,200	5,589,624		
Copper, old and scrap.....	6,327,400	360,000	8,108,700	535,753
Copper in ingots, bars, cakes, slabs and billets.....	243,535,200	18,061,278	310,860,400	27,460,714
Copper in rods, strips, sheets, plates and tubing.....	36,516,100	3,065,480	48,152,900	4,769,923
Copper wire and cable.....		469,552		469,789
Copper manufactures, n.o.p.....		245,221		294,433
Total.....		29,661,697		36,501,654
Copper coin, foreign.....		1,596		3,048
Copper coin, Canadian.....		93		570

DOMINION BUREAU OF STATISTICS

Table 124.—Copper Prices, by Months, 1935 and 1936

Month	Copper (Electrolytic)			
	New York (In cents per pound)		London (In £ sterling per long ton)	
	1935	1936	1935	1936
January.....	8.775	9.025	31.261	38.788
February.....	8.775	9.025	30.244	39.463
March.....	8.775	9.025	31.607	40.227
April.....	8.775	9.169	34.763	41.131
May.....	8.775	9.275	36.733	40.839
June.....	8.634	9.275	34.039	40.357
July.....	7.775	9.352	34.261	41.228
August.....	7.979	9.525	35.976	42.375
September.....	8.504	9.525	37.952	43.267
October.....	8.967	9.563	39.609	45.295
November.....	9.025	10.161	39.396	48.467
December.....	9.025	10.763	39.313	50.364
Average.....	8.649	9.474	35.430	42.650

Transposed into Canadian funds the average price of copper, based on the London market, was 7.79542 cents per pound in 1935 and 9.47695 cents in 1936.

Table 125.—Canadian Copper Ore Reserves as Officially Reported

(American Bureau of Metal Statistics)

—	Year	Province	Short tons ore	Average grade	Short tons copper
				%	
Falconbridge (a).....	1936	Ontario.....	5,331,076	0.88	46,900
Granby Consolidated—Allenby.....	1935	British Columbia...	9,885,069	1.61	159,200
Hudson Bay.....	1935	Manitoba.....	24,770,000	2.10	520,000
International Nickel (a).....	1936	Ontario.....	205,482,592	(b) 2.00	4,109,700
Noranda.....	1936	Quebec.....	30,379,000	2.60	789,100
Normetal.....	1935	Quebec.....	782,600	2.13	16,700
Sherritt Gordon.....	1932	Manitoba.....	4,799,175	2.41	115,900
Waite Amulet.....	1933	Quebec.....	935,445	4.43	41,500
Britannia.....		British Columbia...	(c)	(c)	(c)
Consolidated Copper and Sulphur.....		Quebec.....	(c)	(c)	(c)
Aldermac Mines Ltd.....	1935	Quebec.....	1,743,760	2.00	34,900

(a) Also produces nickel.

(b) Approximate.

(c) Data not available.

Table 126.—World Production of Copper Ore, 1934-1936

(In terms of metal)

(Supplied by Imperial Institute)

(Long tons)

Producing country	1934	1935	1936	Producing country	1934	1935	1936
BRITISH EMPIRE				FOREIGN COUNTRIES —concluded			
United Kingdom.....	14	50	62	Portugal (estimated)...	2,000	2,000	2,000
Northern Rhodesia.....	157,599	168,659	170,728	Roumania.....	88	210	160
Southern Rhodesia.....			10	Spain (estimated).....	30,000	30,000	25,000
Union of South Africa.....	7,738	10,529	8,925	Sweden.....	4,982	6,287	7,975
Canada.....	162,840	187,053	187,959	U.S.S.R. (Russia).....	43,400	62,250	82,000
Newfoundland.....	4,229	2,910	5,258	Yugoslavia.....	42,300	41,000	41,000
Cyprus (estimated).....	3,900	12,232	16,351	Algeria.....	134	18	
Federated Malay States.....			21	Angola (estimated).....	20	(a)	(a)
India (estimated).....	11,500	11,100	11,200	Belgian Congo (smelter)	108,346	105,981	94,156
Australia.....	12,012	16,990	18,561	French Equatorial Africa.....	98		
Total.....	360,000	410,000	420,000	Cuba.....	6,094	6,850	11,447
FOREIGN COUNTRIES				Mexico (b).....	43,569	38,751	29,244
Austria.....	82	54	12	United States (b).....	211,969	339,724	536,349
Bulgaria.....	130	146		Bolivia (exports).....	1,596	1,883	3,198
Czechoslovakia.....	160	240	341	Chile (b).....	252,646	262,864	252,000
Finland.....	8,666	11,380	11,760	Panama.....	116	39	22
France.....	325	586	(a)	Peru.....	27,283	30,237	33,000
Germany.....	25,560	26,987	28,960	China (smelter).....	463	(a)	(a)
Greece.....	169	65	(a)	Formosa (estimated)...	5,000	4,000	(a)
Hungary.....	224	240	119	Japan (smelter).....	65,944	68,215	76,742
Italy.....	388	330	410	Korea.....	1,400	2,200	3,600
Norway.....	20,800	20,190	22,249	Total.....	900,000	1,060,000	1,260,000
				World's Total.....	1,260,000	1,470,000	1,680,000

(a) Information not available.

(b) Amount estimated as recoverable.

Table 127.—World Metal Production of Copper, 1934-1936

(Supplied by Imperial Institute)

(Long tons)

Producing country	1934	1935	1936	Producing country	1934	1935	1936
BRITISH EMPIRE				FOREIGN COUNTRIES —concluded			
United Kingdom.....	11,200	12,400	9,300	Italy.....	446	(d) 354	462
Northern Rhodesia.....	137,897	143,501	142,333	Norway.....	7,863	8,305	8,233
Union of South Africa.....	8,196	11,449	9,865	Spain.....	13,559	11,379	(e) 10,000
Canada (c).....	149,421	172,697	170,676	Sweden.....	7,980	8,677	10,082
India.....	6,300	6,900	7,200	U.S.S.R. (Russia).....	52,491	62,250	82,000
Australia.....	7,970	11,168	13,313	Yugoslavia.....	43,669	38,384	38,778
Total.....	321,000	358,000	353,000	Belgian Congo.....	108,346	105,981	94,156
FOREIGN COUNTRIES				Mexico.....	42,410	37,592	27,942
Austria.....	587	1,316	1,771	United States.....	247,257	372,646	583,285
Belgium.....	60,135	80,429	57,842	Chile.....	243,808	255,825	241,407
Czechoslovakia.....	623	926	1,086	Peru.....	27,590	29,607	32,250
Finland.....			6,531	China.....	463	(a)	(a)
France.....	592	42	(a)	Japan.....	65,944	68,215	76,742
Germany (b).....	52,200	55,100	58,700	Korea.....	1,412	2,135	3,579
				Total.....	980,000	1,140,000	1,340,000
				World's Total.....	1,300,000	1,500,000	1,690,000

(a) Information not available.

(b) Metallgesellschaft figures.

(c) Copper content of blister copper.

(d) 7,889 long tons of secondary copper were also produced.

(e) estimated.

METALS OF THE PLATINUM GROUP

Production of the platinum group metals in Canada during 1936 totalled 235,242 fine ounces valued at \$7,803,806. With the exception of 20 ounces recovered from alluvial deposits in British Columbia, the entire output of these metals in the Dominion represents recoveries made from the

nickel-copper ores of the Sudbury district in Ontario. Of the total output in 1936 platinum comprised 131,571 fine ounces and palladium, rhodium, iridium, etc., 103,671 fine ounces. Canada is now the world's largest producer of platinum metals. Russia and Colombia are the world's other most important platinum producers with the output in troy ounces of crude platinum in these countries during 1936 totalling 100,000 and 38,333 ounces, respectively. The average London price of platinum in 1936 was £8.138 as compared with £7.325 in 1935.

The platinum metals contained in matte produced from the Sudbury ores by the International Nickel Company of Canada, Limited, are refined at Acton, England, and in conformity with the increased output of the copper and nickel refineries, the output of the Acton refinery increased by 22 per cent over 1935 and reached a record level of 232,343 ounces of platinum metals and 10,210 ounces of gold. This company reported that a new laboratory was constructed at Acton to further facilitate the research and development work on precious metals and their alloys. The platinum metals contained in matte produced in the Sudbury area by the Falconbridge Mines Limited are recovered in the refinery of this company which is located at Kristiansand, Norway.

In 1937 the jewellery trade remained a large user of platinum, but greater progress was made with platinum metals generally in the chemical, electrical, and dental industries. There has been an increased use of platinum and palladium for electrical contacts, and of platinum and rhodium for dies for extruding glass fibres. Platinum and platinum-rhodium catalysts, used in the synthesis of sulphuric acid and of nitric acid, have also been in greater use. Rhodium plating for silverware and other metals has improved markedly, and iridium and palladium gained favour in jewellery manufacture. The use of palladium leaf as a decorative material in architecture, bookbinding and sign work is steadily expanding.

Table 128.—Production of Platinum Group Metals in Canada, 1934, 1935 and 1936

	Platinum		Palladium, Rhodium, Iridium, etc.	
	Fine ounces	\$	Fine ounces	\$
1934				
Ontario.....	116,177	4,488,712	83,932	1,699,282
British Columbia.....	53	2,051		
Total.....	116,230	4,490,763	83,932	1,699,282
1935				
Ontario.....	105,335	3,444,455	84,772	1,962,937
British Columbia.....	39	1,275		
Total.....	105,374	3,445,730	84,772	1,962,937
1936				
Ontario.....	131,551	5,319,922	103,671	2,483,075
British Columbia.....	20	809		
Total.....	131,571	5,320,731	103,671	2,483,075

Table 129.—Production of Metals of the Platinum Group, 1927-1936

(From 1887 to 1926 see Mineral Production of Canada, 1928)

Year	Platinum				Palladium*	
	Lode		Placer		Fins oz.	\$
	Fine oz.	\$	Fine oz.	\$		
1927.....	11,217	716,653	11	960	11,247	541,319
1928.....	10,483	706,090	49	2,819	11,909	511,998
1929.....	12,491	845,057	28	1,699	12,408	471,614
1930.....	34,007	1,542,490	17	771	29,959	689,217
1931.....	44,725	1,595,117	50	1,783	39,313	786,260
1932.....	27,284	1,097,021	59	2,372	29,727	548,582
1933.....	24,746	856,190	40	1,400	31,009	645,043
1934.....	116,177	4,488,712	53	2,051	83,932	1,699,228
1935.....	105,335	3,444,455	39	1,275	84,772	1,962,937
1936.....	131,551	5,319,922	20	809	103,671	2,483,075

*Since 1933 includes other platinum metals except platinum.

Table 130.—Production of Certain Metals of the Platinum Group, 1926-1932*

Year	Rhodium		Ruthenium		Osmium		Iridium	
	Fine oz.	\$	Fine oz.	\$	Fine oz.	\$	Fine oz.	\$
1926.....	204	9,969	16	791			14	3,252
1927.....	222	6,853	31	1,073			45	4,945
1928.....	895	20,951	561	16,331			342	78,553
1929.....	3,037	151,850	1,376	66,048			497	119,777
1930.....	(a) 4,133	206,650						
1931.....	(a) 7,605	431,457						
1932.....	(a) 7,886	353,308						

(a) Includes rhodium, iridium and ruthenium as other platinum metals.

*Since 1933 these metals are included with palladium as shown in preceding table.

Table 131.—Imports into Canada and Exports of Platinum, 1936

	Fine oz.	\$
IMPORTS—		
Platinum reports, pans, etc.....		23,788
Platinum wire, and in bars, strips, etc. (x).....		140,868
Platinum crucibles.....		6,489
Total.....		171,145
EXPORTS—		
Contained in concentrates, etc.....		6,841,940
Platinum, old and scrap.....	317	10,657
Total.....		6,832,597

(x) Includes any other of the platinum metals.

Table 132.—Platinum Consumed in Canadian Jewellery and Silverware Industry, 1932-1936

Year	Value	Year	Value
	\$		\$
1932.....	26,928	1935.....	45,627
1933.....	35,714	1936.....	101,129
1934.....	38,307		

Table 133.—Platinum Metals Sold in the United States, as Reported by Refiners and Shown by Consuming Industries, 1936

(From Minerals Year Book, U.S. Bureau of Mines)

(In Troy ounces)

Industry	Platinum	Palladium	Iridium	Others	Total	Percentage of total
1936						
Chemical.....	20,984	124	131	256	21,495	13
Electrical.....	8,750	13,297	894	367	23,308	14
Dental.....	15,489	25,481	148	26	41,144	25
Jewellery.....	50,936	5,778	3,100	1,066	60,880	37
Miscellaneous and undistributed.....	16,288	859	117	756	18,020	11
Total.....	112,447	45,539	4,390	2,471	164,847	100

Table 134.—World Production of Platinum Metals, 1934-1936

(Supplied by Imperial Institute)

(Troy ounces)

Country and product	1934	1935	1936	Country and product	1934	1935	1936
BRITISH EMPIRE				FOREIGN COUNTRIES			
<i>Sierra Leone</i> —				<i>U.S.S.R. (Russia)</i> —			
Crude platinum.....	474	750	484	Crude platinum (estimated).....	100,000	100,000	100,000
<i>Union of South Africa</i> —				<i>Abyssinia</i> —(b)			
Crude (Pt. metals content).....	26,370	19,954	19,751	Platinum (crude).....	5,612	5,350	8,038
Concentrates (Pt. metals content).....	11,372	11,318	13,164	<i>United States</i> —(a)			
Osmiridium (crude) (c).....	5,088	5,047	5,431	Platinum (crude).....	3,720	9,069	9,895
<i>Canada</i> —				New platinum metals recovered by refineries from domestic gold and copper ores—			
Crude platinum (Pt. content).....	53	39	20	Platinum.....	1,062	1,361	4,443
Recovered from Ontario nickel-copper matte—				Palladium.....	1,271	1,115	4,505
Platinum.....	116,177	105,335	131,571	Iridium, Osmiridium etc.....	2	7	36
Other platinum metals.....	83,932	84,772	103,671	<i>Colombia</i> —			
<i>New South Wales</i> —				Platinum (crude).....	54,768	38,628	38,333
Crude platinum.....	180	98	47	<i>Japan</i> —			
<i>Tasmania</i> —				Platinum (crude).....	118	51	34
Osmiridium (crude).....	488	235	281	Palladium.....	(d)	11	(d)
<i>New Zealand</i> —				Iridium.....	(d)	2	(d)
Crude platinum.....		14	29	<i>Belgian Congo</i> —			
<i>Papua</i> (years ended June 30)				Palladium.....	3,588	5,144	12,571
Osmiridium (crude).....	4	9		Platinum.....	1,260	965	3,183
Platinum (crude).....	89	46	24	<i>Panama</i> —			
				Platinum (crude).....		16	19

(a) Secondary platinum metals were recovered in the United States as follows (Troy ounces):—

	1934	1935	1936
Platinum.....	35,494	47,107	55,959
Palladium.....	5,606	7,852	6,786
Iridium.....	1,328	2,191	2,204
Other Platinum metals.....	1,328	1,975	1,217

(b) Amount registered, which is probably not total production.

(c) It is estimated by the Department of Mines, Union of South Africa, that the osmiridium sold in these years contained the amounts of the metals mentioned below (fine ounces):—

	1934	1935	1936
Osmium.....	1,858	1,731	1,670
Iridium.....	1,706	1,501	1,432
Ruthenium.....	713	694	730
Platinum.....	670	594	641
Rhodium.....	30	29	25

(d) Information not available.

CHAPTER FIVE

MISCELLANEOUS METAL MINING INDUSTRIES IN CANADA

Including General Statistics Relating to the Industries in this Group and Commodity Statistics, Showing Production by Provinces, Imports, Exports, Prices and World Output Tables on Aluminium, Antimony, Barium, Beryllium, Cadmium, Calcium, Chromite, Iron Ore, Pig Iron and Ferro-Alloys, Steel and Rolled Products, Lithium, Magnesium, Manganese, Mercury, Molybdenum, Radium, Selenium, Tantalum, Tellurium, Tin, Titanium, Tungsten, Vanadium and Zirconium

1. General Review

Metal-bearing minerals, mined in relatively small quantities by a comparatively few operators, have been grouped by the Dominion Bureau of Statistics for consideration as a single industry. Included with the finally revised statistics relating to the Canadian production of these are notes and statistical data pertaining to various rare or semi-rare metals or metalliferous ores produced in other countries. Metals or metal-bearing ores produced in Canada during 1936 and classified as miscellaneous include bismuth, cadmium, chromite, manganese ore, radium and uranium products, selenium, tellurium and titanium ore. In addition to particulars relating to these metals or products, this chapter contains notes of a summary nature on beryl and beryllium, lithium, magnesium, sodium, tungsten, calcium, aluminium, tin, iron ores, vanadium, mercury, molybdenite and zirconium.

It is to be noted that the majority of the metals listed above as Canadian products and including bismuth, cadmium, selenium and tellurium, represent by-products recovered in the refining of lead, zinc or copper and for this reason such statistics as relate to their production in Canada are included with those of either the silver-lead-zinc mining industry, the copper-gold-silver mining industry, or the non-ferrous smelting and refining industry.

For historical purposes and to provide the interested reader with available data, tables have been prepared for this chapter that set out the known facts regarding domestic and world production of these metals or ores.

Table 135.—Employees, Salaries and Wages in the Miscellaneous Metal Mining Industries in Canada, 1936

	Number of employees		Salaries and wages
	Male	Female	\$
Salaried employees—			
Total.....	12	1	11,110
Wage-earners—			
Surface.....	69	}	131,864
Underground.....	29		
Mill.....	2		
Total.....	100		131,864
Grand Total.....	112	1	142,974

Table 136.—Average Number of Wage-Earners Employed, by Months, 1936

Month	Surface	Under-ground	Mill
January.....	34	10	
February.....	46	7	
March.....	48	17	
April.....	53	13	
May.....	49	14	
June.....	71	17	
July.....	114	30	
August.....	61	48	
September.....	76	55	
October.....	127	19	6
November.....	78	49	10
December.....	67	53	11

2. Commodity Statistics on Aluminium, Antimony, Beryllium, Bismuth, Cadmium, Calcium, Chromite, Iron Ore, Pig-Iron, Ferro-Alloys, Steel and Rolled Products, Lithium, Manganese, Mercury, Molybdenum, Radium-uranium, Selenium, Tellurium, Tin, Tantalum, Titanium, Tungsten, Vanadium, Zirconium

ALUMINIUM

Primary aluminium is produced in Canada only by the Aluminum Company of Canada, Limited. This company operates reduction works at Arvida and Shawinigan Falls in the province of Quebec. No bauxite or aluminium ores are mined in Canada and concentrates for reduction purposes are prepared from imported crude ore in a special plant erected at Arvida. During 1936 the Arvida ore plant was in continuous operation for the production of bauxite concentrates, and aluminium ingot was produced from these at both Shawinigan Falls and Arvida. In addition to these primary operations, the metal is fabricated in several secondary plants in Canada, the output of which includes kitchenware, automobile parts and a variety of other manufactures.

According to the American Bureau of Metal Statistics, world production of aluminium in 1936 totalled 363,428 metric tons, an increase of 40·8 per cent above 1935. Canadian output during the year under review was recorded at 26,900 metric tons or 6,344 tons greater than in the preceding year. As a world producer of aluminium, Canada ranked fifth in 1936, being surpassed in the order of their output by the United States, Germany, Russia and France.

Production of the metal in Japan has increased from 700 metric tons in 1934 to 5,000 metric tons in 1936, while that of Russia has increased from 855 metric tons in 1932 to 37,000 metric tons in 1936.

The average price of the metal in the United States in both 1935 and 1936 was 20·5 cents per pound compared with an average price of 27·03 cents per pound in 1924 and the American Bureau of Metal Statistics remarks that these quotations, especially in recent years, are in excess of prices actually realized on large-scale business.

Table 137.—Imports into Canada and Exports of Aluminium, Alumina, Bauxite and Cryolite, 1936

	cwt.	\$
IMPORTS—		
Alumina.....	1,547	17,006
Bauxite ore.....	(a) 3,428,348	2,663,184
Cryolite.....	(b) 59,463	256,360
Aluminium in pigs, ingots, blocks, notch bars, slabs, billets and blooms.....	547	11,951
Aluminium scrap.....	6,882	120,099
Aluminium in bars, rods and wire.....	3,906	124,850
Aluminium in plates, sheets and strips, including circles.....	14,275	422,638
Aluminium pipes and tubes.....	613	27,299
Aluminium leaf, less than ·005 mm. thick.....		8,378
Aluminium kitchen or household hollowware, n.o.p.....		67,129
Aluminium, manufactures of, n.o.p.....		669,715
Aluminium leaf, n.o.p., or foil less than ·005 inch thick, plain or embossed.....		87,597
Aluminium powder..... lb.	109,777	39,372
Other.....		10,649
Total Aluminium and Its Products.....		4,526,227

(a) 1,710,817 cwt. from the United States and 1,528,655 cwt. from British Guiana.
(b) 56,000 cwt. from Greenland.

Table 137.—Imports into Canada and Exports of Aluminium, Alumina, Bauxite and Criolite, 1936—Concluded

	cwt.	\$
EXPORTS—		
Aluminium scrap.....	20,461	273,866
Aluminium in bars, blocks, etc.—		
To—United Kingdom.....	415,163	8,012,135
United States.....	26,487	487,446
Italy.....		
Brazil.....	897	16,895
China.....	15,024	248,061
Australia.....	7,264	153,042
Japan.....	87,821	1,480,121
Germany.....	2,444	32,635
British India.....	3,887	77,538
Belgium.....	549	17,552
Mexico.....	994	22,773
Switzerland.....	6,613	113,664
Other countries.....	8,959	178,765
Total in bars, blocks, etc.....	576,102	10,840,627
Aluminium kitchen utensils and hollowware.....		20,228
Aluminium, manufactures of, n.o.p.....		363,761
Total Aluminium and Its Products.....		11,498,482

Table 138.—Consumption of Aluminium in Specified Canadian Industries in 1936

Industry	Pounds	Cost at works
		\$
Aluminium products (a)*.....	18,686,000	3,559,403
White metal alloys*.....	1,052,658	215,761
Electrical apparatus and supplies.....	1,511,281	505,481
Brass and copper products.....	1,953,996	298,651
Iron and steel products.....	563,284	1,236,400

(a) Largely for the manufacture of cooking utensils.

*Not inclusive of possible scrap.

Table 139.—Estimated World production of Aluminium, 1934-1936

(Supplied by Imperial Institute)

(Long tons)'

Producing country	1934	1935	1936
BRITISH EMPIRE			
United Kingdom.....	12,700	14,900	16,000
Canada.....	15,500	21,100	25,800
Total.....	28,200	36,000	41,800
FOREIGN COUNTRIES			
Austria.....	2,000	2,200	2,200
Hungary.....		300	900
Belgium.....	100	(a)	(a)
France.....	14,835	21,658	26,100
Germany (c).....	36,596	69,661	95,648
Italy (c).....	12,643	14,871	15,919
Norway (c).....	15,104	14,750	15,162
U.S.S.R. (Russia).....	14,164	25,100	29,500
Spain.....	(c) 1,211	1,200	600
Switzerland.....	8,000	11,600	15,600
United States (b) (c).....	33,115	53,257	100,415
Sweden (c).....	292	1,806	1,790
Japan.....	700	3,950	4,000
Total.....	139,000	220,000	308,000
World's Total.....	167,000	256,000	350,000

(a) Information not available.

(b) Secondary metal was recovered as follows:—

1934.....	41,400 long tons.
1935.....	45,900 "
1936.....	46,000 "

(c) Official figures.

Table 140.—World Production of Bauxite, 1934-1936

(Supplied by *Imperial Institute*)

(Long tons)

Producing country	1934	1935	1936	Producing Country	1934	1935	1936
BRITISH EMPIRE—				FOREIGN COUNTRIES—Con.			
Northern Ireland.....	57			Greece.....		9,339	127,846
British Guiana (c).....				Hungary.....	182,069	207,745	323,893
60% or over alumina.....	50,998	107,785	157,945	Italy.....	129,193	167,378	258,104
50-60% alumina.....	2,225	3,414	11,525	Yugoslavia.....	83,489	212,694	287,560
30 to 50% alumina (b).....	11,666	26,410	39,851	Roumania.....	1,435	1,450	2,007
India.....	18	7,635	3,644	U.S.S.R. (Russia) (estimated)	60,000	130,000	200,000
Australia.....	1,113	1,156	740	United States.....	157,838	233,912	372,005
Unfederated Malay States.....			36	Dutch Guiana (exports).....	99,412	113,370	230,215
Total.....	66,000	146,000	214,000	Netherlands East Indies.....		16,444	147,963
				Brazil (exports).....			6,889
FOREIGN COUNTRIES—				French Indo-China.....			30
France.....	520,150	504,750	638,250	Total.....	1,240,000	1,610,000	2,610,000
Germany.....	6,456	8,412	12,229	World's Total.....	1,310,000	1,760,000	2,820,000
Mozambique.....		30	29				
Austria (estimated).....	3,000	3,000	3,000				

(b) Ore remains at the mines.

(c) The shipments from mines of dried and washed ore were as follows:—

	1934	1935	1936
Metallurgical.....	20,406	75,139	116,645
Chemical.....	28,181	33,198	44,430
Refractory.....	1,775	2,581	6,021

Table 141.—Production (Exports) of Cryolite from Greenland, 1932-1936

	Long tons
1932.....	17,592
1933.....	10,187
1934.....	14,999
1935.....	23,104
1936.....	17,135

ANTIMONY

No commercial production of metallic antimony has occurred in Canada since 1917 and no by-product output of the metal since 1926 in which year it was reported as being contained in silver-lead-bismuth bullion produced from the cobalt-silver ores of Northern Ontario. The greater part of the refined antimony made in Canada was produced at Trail, British Columbia, during the years 1907, 1909, 1915 and 1916 by the Consolidated Mining and Smelting Company of Canada, Limited, the metal being recovered in the treatment of silver-lead ores. It was recently announced that the metal would again be produced at Trail, British Columbia, in 1938.

Minerals containing antimony occur in Nova Scotia, New Brunswick, Quebec, Ontario, Manitoba, and British Columbia, also in the Yukon Territory. No commercial shipments of antimony ores, known as such, have been made in Canada for many years. Stibnite (Sb_2S_3) occurs in the veins of the Reliance Gold Mines, Bridge River mining district, British Columbia, and it was reported in the press during 1937 that this property might be reopened for the purpose of mining antimony ore. The mineral also occurs on the property of the Gray Rock Mining Syndicate in the Truax Creek area of the same province and the British Columbia Department of Mines reports—"The antimony content is of interest if, at a more advanced stage of development, it can be shown that a clean stibnite concentrate can be made." It was also announced that antimony ore was being mined during the latter part of 1937 at the Congress mine adjoining the Reliance property.

According to the United States Bureau of Mines, the world production of antimony in 1936, stimulated by the high prices of the past two years, increased 15 per cent over that of 1935. The estimated production of 31,000 metric tons in 1936 almost equalled the 1929 output. China's output decreased slightly, but in 1936 it continued to be the principal producer, having contributed 53 per cent of the estimated total. The average New York price for Chinese antimony in 1936 was 12.97 cents per pound (duty paid), a decline of 8 per cent from 1935. Over half of the primary antimony consumed in the United States is used in the manufacture of such products as storage batteries, cable covering and bearing metals.

"Metal and Mineral Markets", New York, quoted antimony ore—November, 1937—per unit of antimony contained, \$1.80 to \$2.20 f.o.b. New York. London, per long ton unit, 7s. 9d. to 8s. 3d. for 60 to 65 per cent sulphide ore.

Table 142.—Production of Antimony in Canada, 1911-1936

Year	Antimony ore		Refined regulus		Antimony in silver-lead-bismuth bullion exported	
	Tons	Value	Pounds	Value	Pounds	Value
		\$		\$		\$
1911-1914.....						
1915.....	1,314	81,283	59,440	11,888		
1916.....	885	94,537	107,185	41,823		
1917.....	361	22,000				
1918-1924.....						
1925.....					1,751	206
1926.....					1,596	281
1927-1934.....						
1935.....						
1936.....						

NOTE.—For years 1886 to 1910 see previous reports.

Table 143.—Antimony Used in Specified Canadian Industries, 1935 and 1936

Industry	1935		1936	
	Pounds	\$	Pounds	\$
White metal alloys.....	(*) 595,733	73,048	(*) 541,398	63,026
Electrical apparatus and supplies.....	130,380	15,267	156,397	19,021

(*) Regulus.

Table 144.—Imports of Antimony and Antimony Products into Canada, 1936

	Pounds	\$
Antimony or regulus of, not ground, pulverized or otherwise treated.....	1,279,535	109,656
Antimony oxide and titanium oxide (*).....	4,198,017	424,451
Antimony salts—tatar emetic, etc.....	45,356	7,149
Antimony salts for dyeing.....	366	40

(*) Including white pigments containing not less than 14 per cent by weight of titanium.

Table 145.—World Production of Antimony Ore, 1934-1936

(In terms of metal)

(Supplied by *Imperial Institute*)

(Long tons)

Producing country	1934	1935	1936	Producing country	1934	1935	1936
BRITISH EMPIRE—				FOREIGN COUNTRIES—Con.			
Australia.....	9	20	(a)	Honduras.....		5	1
Union of South Africa.....			17	Yugoslavia.....		200	1,600
India (estimated).....		10	40	French Indo-China.....		20	46
Southern Rhodesia.....			84	Algeria.....	650	1,988	1,217
FOREIGN COUNTRIES—				Morocco (French).....		220	103
United States (b).....	361	499	674	Morocco (Spanish).....	309	(a)	(a)
Czechoslovakia.....	1,142	2,391	1,020	Mexico.....	2,626	4,498	7,188
France.....	261		(a)	Bolivia (exports).....	1,182	3,348	6,421
Greece.....	90	40	196	Peru.....	73	308	1,224
Italy.....	355	446	526	China.....	15,200	18,000	17,000
Portugal.....			23	Turkey.....	33	101	562
Austria.....			123	Japan (estimated).....	35	60	150
				Korea.....		2	17

(a) Information not available.

(b) Secondary metal was recovered as follows:—

1934.....	6,700 long tons
1935.....	8,600 "
1936.....	8,800 "

BARIUM

Barium metal is used in relatively small quantities for the manufacture of certain electrical equipment; nickel-barium and nickel-copper-barium alloys, in the form of wire, have been employed in spark plug construction owing to their high thermionic electron emission. The metal has also been utilized in the vacuum tube industry because of its ability to remove the last traces of gases and to emit electrons easily. Barium has been produced in the United States, Germany, France and Great Britain but not yet commercially in Canada. A series of lead-calcium-barium alloys are used for bearing purposes. A range of barium-aluminium and barium-magnesium alloys are produced in England. The price of the metal in the United States is now below \$7.50 per pound.

BERYLLIUM

The principal ore of beryllium is the mineral beryl— $\text{Be}_3\text{Al}_2(\text{SiO}_3)_6$. There are several known occurrences of this mineral in Canada and shipments of beryl have been made for experimental purposes from deposits in Renfrew county, Ontario, and the Oiseau river area in Manitoba. Beryl usually occurs in pegmatites and is sometimes recovered as a by-product in the mining of the feldspar and mica content of these rocks. During 1936 Renfrew Minerals Limited reported the recovery of several tons of hand-picked beryl from a property worked in Lyndoch township, Renfrew county, Ontario, however, no commercial shipments of the mineral were reported in Canada during the year under review.

Beryl has been extensively worked in the Jaipur State, Rajputana, India, where it is found in mica-bearing pegmatites. The output in 1935 was 139 tons and was exported to the United States and Germany.

Sporadic occurrences of beryl in the form of large crystals in pegmatites have been located over an extensive area in Namaqualand, Cape Province, South Africa. Only small quantities have been recovered, the production in 1936 amounting to 5.3 short tons valued at £38 compared with 58 tons worth £421 in 1935.

Interest in the supply and uses of beryllium has increased greatly in recent years and research continues to find new uses for beryllium alloys. In the United States beryllium-copper alloys have leading interest while in Germany considerable progress has been made with nickel-base beryllium alloys. According to the United States Bureau of Mines, a close co-operation is maintained between the American producers of beryllium master alloys and leading German interests.

BISMUTH

Bismuth production in Canada represents the metal recovered from silver-lead ores smelted at Trail, British Columbia, and the metal contained in silver-lead-bismuth bullion produced in the treatment of silver-cobalt ores at Deloro, Ontario.

Canadian production of bismuth, as described, totalled 364,165 pounds valued at \$360,523 in 1936 compared with an output of 13,797 pounds valued at \$13,245 in 1935. Of the 1936 production, 3,552 pounds valued at \$3,516 were credited to Ontario and 360,613 pounds at \$357,007 to British Columbia. The output of the metal during 1936 was the greatest ever recorded in the Canadian mining industry.

The chief bismuth producing countries include Germany, Peru, United States, Japan, Canada and Spain, and the greater part of the world's production of the metal represents a by-product in the treatment of lead, copper, silver, gold and tin ores.

Most of the world's bismuth output is consumed for medicinal and pharmaceutical purposes; however, its use in industry as a metal has been increasing recently. It is now utilized in the manufacture of low melting alloys such as sprinkler nozzles. It is also employed in enamelling and the manufacture of optical glass, aluminium alloys, and iron castings.

"Metal and Mineral Markets", New York, quoted (November, 1937) bismuth at \$1 per pound in ton lots. London, 4s.

Table 146.—Production of Bismuth in Canada, 1927-1936

Year	Pounds	\$	Year	Pounds	\$
1927.....	2,072	1,033	1932.....	16,855	7,340
1928.....	14,002	5,067	1933.....	78,303	81,526
1929.....	194,329	307,114	1934.....	253,644	301,215
1930.....	12,732	6,366	1935.....	13,797	13,245
1931.....	118,207	157,650	1936.....	364,165	360,523

Table 147.—Bismuth Used in the Manufacture of Canadian Medicinal and Pharmaceutical Preparations, 1935 and 1936

Item	1935		1936	
	Pounds	\$	Pounds	\$
Bismuth metal.....	34,276	26,170	32,307	28,649
Bismuth salts.....	10,927	18,027	12,572	20,141

Imports into Canada of metallic bismuth, in its natural state, totalled 29 pounds valued at \$35 in 1936 compared with 2,048 pounds worth \$1,675 in 1935.

Table 148.—World Production of Bismuth, Ore, etc.,* 1934-1936

(Supplied by *Imperial Institute*)

(Cwt.=112 pounds)

Producing country and description	1934	1935	1936
BRITISH EMPIRE			
Union of South Africa—ore (<i>Bi Content</i>).....		4	
Canada—metal and content of bullion.....	2,265	123	3,251
India—(ore).....		2	1
Australia—(ore, etc.).....	297	470	361
FOREIGN COUNTRIES			
Germany (Saxony)—ore (<i>Bi Content</i>).....	(a)	80	(a)
Spain—(ore).....	3,543	(a)	(a)
(metal).....	905	(a)	(a)
Mexico—ore (<i>Bi content</i>).....	2,033	4,204	3,259
Bolivia (exports)—ore, etc. (<i>Bi Content</i>).....	893	412	1,257
Peru—Lead—Silver bullion, etc. (<i>Bi Content</i>).....	2,358	195	(a)
Metal.....	3,014	2,967	7,598
China—ore (<i>Bi Content</i>).....	570	(a)	(a)
Japan—(metal).....	991	1,060	1,106
Norway—copper ore (<i>Bi Content</i>).....		16	11
Argentina—ore (<i>Bi Content</i>).....	90	650	310
Roumania—ore.....	120	280	900

*Bismuth is also recovered as a by-product in the United States, United Kingdom, France, Sweden and U.S.S.R. (Russia).

(a) Information not available.

CADMIUM

Canadian production of cadmium represents the recovery of the metal as a by-product in the electrolytic refining of zinc. Production up to 1935 came entirely from the treatment of zinc-bearing ores at Trail, British Columbia, by the Consolidated Mining and Smelting Company of Canada, Limited. The commercial production of the metal from the copper-gold-silver-zinc ores of the Flin Flon mine was commenced in Manitoba for the first time in 1936. Production of cadmium in the Dominion during 1936 totalled 785,916 pounds valued at \$699,465 compared with 580,530 pounds worth \$441,205 in 1935. Of the 1936 output, 526,034 pounds valued at \$468,170 were credited to British Columbia, 148,133 pounds at \$131,838 to Manitoba and 111,749 pounds at \$99,457 to Saskatchewan. The proportioning of the cadmium recovered from the Flin

Flon mine ores between Manitoba and Saskatchewan results from the interprovincial boundary intersecting the deposit. The quantity and value of cadmium production in the entire Dominion during 1936 were the highest ever recorded.

The greater part of the world's cadmium output is consumed in the manufacture of alloys and compounds and as a plating material. In a review of cadmium in 1936, the United States Bureau of Mines states—"The future of cadmium alloys in automobile bearings seems to depend upon the ability of producers to furnish adequate supplies of the metal at prices below those prevailing in recent years. The problem of producing lubricants that will not corrode cadmium alloys apparently has been solved. The use of cadmium in compounds increased in 1936. Production of cadmium lithopone, which was curtailed sharply in 1935 because of shortage of supplies, increased materially, and the manufacture of sulphides increased substantially also. World production of cadmium in 1936 is estimated at 3,665 metric tons."

"Metal and Mineral Markets", New York, quoted cadmium (November, 1937)—per pound, producers' minimum price on quantity business, commercial sticks, \$1.25; patented shapes, to platers, \$1.60. Prices largely nominal. London quotes 6s. to 7s. per pound.

Table 149.—Cadmium Production in Canada, 1928-1936

Year	British Columbia		Manitoba		Saskatchewan	
	Pounds	\$	Pounds	\$	Pounds	\$
1928.....	491,894	341,374				
1929.....	773,976	675,294				
1930.....	456,582	337,871				
1931.....	323,139	180,958				
1932.....	65,425	26,824				
1933.....	246,041	78,733				
1934.....	293,611	95,665				
1935.....	580,530	441,203				
1936.....	526,034	468,170	148,133	131,838	111,749	99,457

In 1935 there were 72,104 pounds of cadmium valued at \$60,716 used in the Canadian white metal alloys industry; the consumption of the metal in the same industry during 1936 was 48,939 pounds worth \$41,561.

Statistics relating to Canadian exports or possible imports of cadmium are not published separately by the Department of National Revenue, Ottawa.

Table 150.—World Production of Cadmium, 1934-1936

(Supplied by *Imperial Institute*)

(Lb. avdp.)

Producing country	1934	1935	1936
BRITISH EMPIRE			
Canada.....	(c) 293,611	580,530	785,916
Australia.....	380,493	489,666	472,248
South West Africa (d).....	140,000	320,000	218,000
FOREIGN COUNTRIES			
Belgium.....	498,245	332,898	637,100
France.....		266,759	
Italy.....	18,398	35,300	121,000
United States—			
Metal.....	2,777,384	3,477,091	3,633,495
Compounds (metal content).....	566,700	507,400	626,800
Mexico (b).....	848,149	1,317,321	1,179,510
U.S.R.R. (Russia).....	5,700	26,400	250,000
Norway.....	302,030	260,143	224,598
Poland.....	316,486	248,458	310,000
Germany.....	(a)	364,000	668,000
Japan (estimated).....	100,000	100,000	100,000

Cadmium is also produced in Sweden.

(a) Information not available.

(b) Including cadmium content of flue dust, etc., exported for treatment.

(c) Excluding cadmium precipitate produced at Flin Flon, Manitoba.

(d) Cadmium content of shipments of dust from stock to Germany.

CAESIUM

In nature caesium is relatively rare, occurring in the mineral Pollucite and in some of the lepidolites and carnallites. The principal use of the element is in the manufacture of photoelectric cells which are employed extensively in the motion ("talkies") picture industry. Caesium salts are now produced commercially in the United States, Germany, Russia and possibly some other European countries. The principal compounds are the chloride and chromate and the price of these approximated \$0.45 a gram in 1936. The metal itself sells for \$1.00 a gram or less. Possible imports of caesium or its compounds into Canada are not shown separately and no commercial production of caesium ores in the Dominion has been recorded.

CALCIUM

Calcium has been employed as a hardening agent in certain lead alloys and for the debismuthizing of lead, also as a deoxidizer for copper and its alloys and deoxidizing and grain-refining cast iron, nickel, and nickel alloys. The metal is not made in Canada; in the United States it is produced from calcium carbide.

Calcium is quoted in the United States at 75 cents per pound, in ton lots, for a 98 to 99 per cent product.

There is no published record of any Canadian imports of calcium metal during either 1935 or 1936.

CHROMITE

The mineral chromite (FeO , Cr_2O_3) is the commercial source of the metal chromium; it is also used extensively in the manufacture of refractory brick. The metal is a necessary constituent of many high-speed cutting tools, certain armour plate, and stainless steels.

The principal chromite producing countries are Russia, South Africa, Turkey, Southern Rhodesia, Cuba, New Caledonia, Yugoslavia, and India. Production of the mineral in Canada during recent years has been relatively small, coming almost entirely from the Eastern Townships, Quebec. During the past few years considerable development work was conducted on a chromite deposit located at Obongo Lake, in the Thunder Bay district of Ontario; comparatively small shipments were made from this property in 1935 and 1936. The owners of this mine, the Chromium Mining and Smelting Corp. Ltd., also erected and placed in operation a modern electric smelting plant at Sault Ste. Marie, Ontario, for the production of ferrochrome and ferrosilicon.

The total value of chromite produced in Canada during 1936 was \$13,578, of which \$8,508 were credited to Quebec mines and \$5,070 to Ontario. Production of the mineral in Canada during the first six months of 1937 totalled 210 short tons valued at \$3,286.

Statistics relating to Canadian imports or possible exports of chromite are not published separately.

November, 1937, chrome ore quotations by "Metal and Mineral Markets", New York, were—Long ton, c.i.f. Atlantic ports, Indian ores, \$22 to \$23 for 45 to 47 per cent Cr_2O_3 ore, and \$26 to \$26.50 for 48 to 50 per cent ore. Russian ores—45 per cent Cr_2O_3 , nominal. London 100s. to 110s. for 48 per cent Rhodesian, and 110s. to 115s. for 55 to 57 per cent New Caledonian.—quotations nominal.

Table 151.—Production of Chromite in Canada, 1925-1936

Year	Short tons	Value
		\$
1925-1928.....		
1929.....	126	900
1930.....		
1931.....		
1932.....	78	1,113
1933.....	30	343
1934.....	111	1,578
1935.....	1,144	14,947
1936.....	(a)	13,578

NOTE.—For the years 1886 to 1924, see previous reports.

(a) Quantity not published.

Table 152.—Imports of Chromium and Chromium Products into Canada, 1936

	Quantity	\$
Chromium metal and tungsten metal, in lumps etc., when imported by manufacturers for alloying purposes..... lb.	140,834	60,382
Nickel chromium in bars or rods not more than 0.75 inches diam. containing 60%† nickel and 10%† chromium for use as electric resistance wire, etc..... lb.	52,825	51,170
Chrome firebrick..... xx		68,082
Bichromate of potash—crude..... lb.	139,735	11,556
Bichromate of soda..... lb.	2,959,488	178,167

Table 153.—Consumption of Certain Chromium Products and Chrome Ore in Specified Canadian Industries, 1936

Industry	Item	Pounds	\$
Steel—			
Ingots and castings.....	Chrome ore.....	725,760	9,965
Ingots and castings.....	Ferrochrome.....	1,223,040	106,961
Paints, pigments and varnishes.....	Chrome colours.....	1,333,542	193,794
Paints, pigments and varnishes.....	Sodium bichromate.....	530,521	41,867
Leather tanning.....	Sodium bichromate.....	1,789,054	151,496

NOTE.—In addition to the items listed above, a considerable quantity of chromite is utilized in the manufacture of Canadian ferro-alloys, also a relatively small quantity of sodium bichromate is consumed in the chemical industry.

Table 154.—World Production of Chrome Ore, 1934-1936

(Supplied by Imperial Institute)

(Long tons)

Producing Country	1934	1935	1936	Producing Country	1934	1935	1936
BRITISH EMPIRE				FOREIGN COUNTRIES—CON.			
Southern Rhodesia.....	70,961	104,240	180,499	U.S.S.R. (Russia) (e).....	129,000	181,500	216,000
Union of South Africa.....	60,388	89,003	172,896	Cuba.....	57,325	42,081	69,257
Cyprus.....	966	1,179	500	United States.....	341	440	269
Canada.....	99	1,022 (d)	487	Brazil (exports).....		5	3,829
India.....	21,576	39,127	49,486	Japan.....	26,792	35,736	37,868
Australia.....	1,716	595	415	Turkey.....	117,951	148,096	161,292
Total.....	156,000	235,000	404,000	New Caledonia.....	54,310	54,437	47,000
FOREIGN COUNTRIES				Guatemala (b).....	792		
Greece.....	30,209	29,309	46,599	Bulgaria.....	84	320	265
Yugoslavia.....	46,604	51,540	53,190	Philippine Islands (c).....		1,272	11,703
Norway.....	41			Total.....	463,000	545,000	650,000
				World's Total.....	619,000	780,000	1,050,000

(b) Imports into the United States from the country indicated.

(c) Exports.

(d) Excluding ore shipped in Ontario for experimental purposes.

(e) Probably includes some ore needing concentration.

COLUMBIUM

The element has not been recovered commercially in Canada. The mineral columbite, however, has been reported as occurring in Renfrew County, Ontario. Columbium inhibits intergranular corrosion of high-chromium steels. The United States Bureau of Mines reported that in 1936 fully 40 tons of ferrocolumbium were sold in the United States and the demand for columbo-tantalites increased substantially. Whereas only a few years ago the columbium content of even high-grade ores was not paid for, as much as £6 15s. a long ton unit has been offered for mixed ores containing as low as 60 per cent $\text{Cb}_2\text{O}_5 + \text{Ta}_2\text{O}_5$. American supplies of columbite are drawn from Nigeria and it is reported that columbo-tantalite is also being produced in the Belgian Congo as a by-product of tin mining operations. Ferro columbium, made at Niagara Falls, N.Y., as a 50-per cent alloy, sells for \$2.50 a pound of contained columbium.

IRON ORE

No iron ores, known as such, have been mined in Canada for some years. Nova Scotia, with its large iron and steel industry, is not a producer of iron ore. The large deposits of high grade ore in Newfoundland, owned by the Dominion Steel and Coal Corporation, are much more readily accessible and of a higher and more constant grade than the iron ore deposits in Nova Scotia.

Iron ore was first mined and smelted in the province of Quebec early in the eighteenth century, and from that time until 1883, the industry was carried on almost continuously at Three Rivers in the St. Maurice district. Other furnaces using local ore were operated at Radnor Forges and Drummondville, the last to shut down being the Drummondville furnace in 1911. At the present time only titaniferous ore is mined in Quebec; this ore is produced near Baie St. Paul and is shipped for the recovery of its titanium content.

More iron ore has been produced in Ontario than in any other province; in northwestern Ontario, about 1899, a deposit of hematite, that later developed into the Helen mine, was found. This property was the main source of Ontario's iron ore output for a number of years. The province has a large supply of low-grade iron ore, but beneficiation processes must be applied to make these ores suitable for commercial use.

Different varieties of iron ore are found in various parts of British Columbia, the most important of which are the magnetite deposits which occur on the islands along the coast.

A report issued by the Bureau of Mines, Ottawa, states that the Algoma Steel Corporation's new Helen mine in the Michipicoten district of Ontario has proved reserves variously estimated at 60,000,000 to 80,000,000 tons of iron carbonate rather high in sulphur that requires roasting to fit it for use in the blast furnace. In the Sudbury district, Moose Mountain, Limited has developed some 33,000,000 tons of proved and provable ore consisting of low-grade siliceous magnetite carrying, in its natural state, about 35 per cent of iron.

A revival in iron ore mining in Ontario is indicated by the fact that during the summer of 1937 the Algoma Properties Limited, commenced rebuilding the surface equipment at the new Helen mine and sampling of the Moose Mountain mine was started by the M. A. Hanna Co. of Cleveland, Ohio. An act passed by the Ontario Legislature has provided for a bounty of two cents per unit of iron content for a period of ten years commencing January 1, 1939.

Imports of iron ore into Canada during 1936 totalled 1,317,033 short tons valued at \$2,633,925 compared with 1,509,933 tons worth \$2,960,207 in 1935. Of the 1936 imports, 755,414 tons worth \$1,598,704 came from the United States, 489,036 tons at \$873,393 from Newfoundland, 36,209 tons at \$82,962 from Brazil, 10,808 tons at \$19,071 from Morocco and 8,316 tons worth \$28,413 from Norway.

Iron ore quotations (November, 1937)—per long ton, lower lake ports—Lake Superior ore: Mesabi, non-bessemer, 51½ per cent iron \$4.95; non-bessemer, \$5.10. Eastern ores, cents per long ton unit, delivered at furnace, foundry and basic 56 to 63 per cent, 9 to 10 cents.

Table 155.—Shipments of Iron Ore from Wabana Mines, Newfoundland, 1927-1936

(For years 1895 to 1926 see Mineral Production of Canada, 1928)

Year	To Nova Scotia	To United States	To Europe	Total shipments
	Short tons	Short tons	Short tons	Short tons
1927.....	480,757	68,354	946,569	1,495,680
1928.....	690,316	41,493	1,001,833	1,733,642
1929.....	763,168	85,501	850,370	1,699,039
1930*.....	523,918	54,623	740,774	1,319,315
1931.....	234,148	25,670	530,079	789,897
1932*.....	.....	.....	166,303	166,303
1933.....	.....	.....	254,383	254,383
1934*.....	346,178	.....	344,769	690,947
1935.....	611,581	.....	81,123	692,704
1936.....	527,540	12,656	252,676	792,872

* European shipments in 1930, 1932 and 1934 were to Germany only, while in 1935 and 1936 shipments went to both Germany and Great Britain.

Table 156.—Imports into Canada, and Exports of Iron Ore, 1935 and 1936

	1935		1936	
	Quantity	Value	Quantity	Value
	Short tons	\$	Short tons	\$
IMPORTS—				
Iron ore from United States.....	762,146	1,561,935	755,414	1,598,704
Iron ore from Newfoundland.....	693,375	1,236,898	489,036	873,395
Iron ore from other countries.....	54,412	161,374	72,583	161,826
Total.....	1,509,933	2,960,207	1,317,033	2,633,925
EXPORTS— Total.....	2,746	9,826	2,725	8,669

Table 157.—World Production of Iron Ore (including Manganiferous Iron Ore)

(Supplied by Imperial Institute)

(Long tons)

Producing Country	Ore			Estimated Iron Content		
	1934	1935	1936	1934	1935	1936
BRITISH EMPIRE						
United Kingdom (b).....	10,586,846	10,895,385	12,701,386	3,176,054	3,268,616	3,810,416
Sierra Leone (shipments).....	229,465	433,540	566,595	130,800	247,100	323,000
Union of South Africa.....	229,494	299,247	359,219	141,391	188,615	231,373
Newfoundland.....	506,616	662,441	727,355	263,000	344,000	378,000
India.....	1,916,918	2,364,297	2,553,247	1,230,000	1,510,000	1,640,000
Unfederated Malay States.....	1,135,649	1,411,636	1,654,547	730,000	900,000	1,060,000
Australia.....	1,263,708	1,874,350	1,889,599	834,000	1,237,000	1,247,000
New Zealand.....	2,806	10,646	(a)	1,300	4,900	(a)
Total.....	15,870,000	17,950,000	20,460,000			
FOREIGN COUNTRIES						
Austria.....	459,462	763,175	1,008,110	160,687	264,997	358,062
Belgium.....	114,060	161,920	187,649	51,000	73,000	(a)
Bulgaria.....		2,333	6,159		1,516	4,003
Czechoslovakia.....	530,233	719,512	1,072,414	174,265	237,693	346,626
France.....	31,509,515	31,539,780	32,894,351	11,000,000	11,000,000	11,500,000
Germany.....	4,274,092	5,947,855	7,450,638	1,350,639	1,819,361	2,222,989
Greece.....	145,080	200,922	275,845	61,627	97,196	131,522
Hungary.....	67,775	189,357	275,256	24,496	63,466	92,293
Italy.....	494,153	559,771	844,513	247,516	280,000	422,000
Luxemburg.....	3,773,297	4,068,520	4,818,667	1,155,197	1,248,689	1,452,872
Norway.....	558,452	753,067	833,435	362,562	489,443	542,020
Poland.....	243,458	327,059	461,253	77,000	103,000	147,000
Portugal.....	2,849	866	6,436	1,300	400	3,500
Roumania.....	82,270	92,331	106,717	38,854	41,000	48,000
Spain.....	2,060,929	2,591,570	(a)	970,000	1,220,000	(a)
Sweden.....	5,170,093	7,807,566	11,071,933	3,200,000	4,783,000	6,744,500
Switzerland.....	(a)	3,813	10,000	(a)	(a)	(a)
U.S.S.R. (Russia).....	21,169,100	26,421,000	27,477,000	(a)	(a)	(a)
Yugoslavia.....	177,002	231,022	443,738	89,000	116,000	222,000
Algeria.....	1,305,488	1,648,180	1,854,699	691,900	873,500	983,000
Belgian Congo.....	8,400	8,400	(a)	(a)	(a)	(a)
Egypt.....	200	15		90	7	
Morocco (Spanish).....	811,785	1,149,323	1,036,355	447,000	632,000	570,000
Tunis.....	537,900	496,000	715,000	277,000	257,000	367,000
Cuba.....	96,500	263,640	167,975	44,400	118,000	75,000
Mexico.....	104,128	94,080	121,176	66,648	60,257	77,630
United States (c).....	24,809,438	31,064,436	49,729,624	12,400,000	15,500,000	24,900,000
Chile.....	957,800	835,987	1,332,325	575,215	508,989	800,000
China.....	1,338,100	(a)	(a)	550,000	(a)	(a)
French Indo-China.....	1,512	625	9,859	692	271	4,793
Japan.....	424,863	507,718	1,723,261	(a)	(a)	(a)
Korea.....	561,454	588,663	619,000	315,000	341,000	(a)
"Manchoukuo".....	1,115,471	1,454,598	(a)	580,000	(a)	(a)
Philippine Islands (exports).....	7,125	278,836	644,120	(a)	(a)	(a)
Total.....	103,000,000	122,000,000	149,000,000			
World's Total.....	119,000,000	140,000,000	170,000,000			

(a) Information not available.

(b) In addition bog ore and iron ore (not used for smelting) were produced as follows:—

1934.....	9,709 long tons.
1935.....	7,986 "
1936.....	7,224 "

(c) Including shipments of manganiferous iron ore up to 35 per cent Mn.

IRON AND STEEL AND THEIR PRODUCTS

The Primary Iron and Steel Industry

Statistics for the primary iron and steel industry cover the operations of plants engaged chiefly in the manufacture of (a) pig iron, (b) ferro-alloys, (c) steel ingots and direct steel castings, (d) rolled and drawn iron and steel products such as bars, plates, sheets, strips, rails, wire rods, structural shapes, etc. Forty firms were included in this industry in 1936 and reports were received for 55 different plants or departments, including 4 blast furnace departments, 4 ferro-alloy plants, 31 steel furnace divisions and 16 rolling or drawing mills. Separate reports were received for blast furnace departments, steel furnace divisions and rolling mills even when they were really units of a single plant.

Factory sales of pig iron, steel and ferro-alloys and rolled products were nearly 20 per cent higher in 1936 than in 1935, the values being \$46,636,892 and \$38,700,961 respectively. The 25 works in Ontario reported sales at \$30,019,258 or 64 per cent of the total for Canada; 6 divisions in Nova Scotia accounted for \$10,108,447 or 21 per cent, and 15 works in Quebec had total sales worth \$5,074,845 or almost 11 per cent of the total. There were also 4 operating plants in Manitoba, 1 in Alberta and 5 in British Columbia.

Capital employed in 1936 was reported at \$92,103,774 of which \$65,178,028 represented the value of land, buildings and plant equipment, \$16,863,296 was the value placed on the raw or finished materials on hand and in process, and \$10,062,450 was the total of operating capital such as cash, bills receivable, etc. As at the end of the year the total capital for Ontario was reported at \$57,527,056, for Nova Scotia \$20,112,270, for Quebec \$12,665,789, for Manitoba \$1,465,671 and for Alberta and British Columbia, \$332,988.

Employees in this industry numbered 11,138 in 1936 against 9,523 in the previous year. About 782 persons worked in the blast furnace departments, 391 in ferro-alloy plants, 3,852 in the steel furnace divisions and 6,113 in the rolling mills. About 60 per cent of the total, or 6,686 were employed in Ontario, 2,015 in Quebec, 1,996 in Nova Scotia, 327 in Manitoba and 114 in Alberta and British Columbia.

Payments in salaries and wages amounted to \$13,830,377, an increase of 13 per cent over the total of \$12,279,390 in 1935.

Expenditures for fuel and electricity totalled \$5,440,129 in 1936 against \$4,845,559 a year ago. Included in the 1936 total was electricity at \$1,714,873, gas at \$1,498,203, coal at \$1,275,377, fuel oil at \$682,776, coke at \$163,288, tar at \$82,879, and other fuel at \$22,733.

Pig Iron.—Production of pig iron increased 13 per cent to 678,231 long tons in 1936 compared with 599,875 tons in 1935 and 404,995 tons in 1934. Output of basic iron was given at 530,929 tons or 78 per cent of the total; malleable iron amounted to 62,259 tons and the foundry grade to 85,043 tons.

Sales of pig iron by the producers totalled 168,054 tons at \$3,327,716 in 1936 against 131,749 tons at \$2,650,990 in 1935. Transfers of pig iron to other departments of the producing companies amounted to 517,872 tons, or 16 per cent more than last year.

Imports of pig iron during the calendar year declined to 3,960 tons from 8,920 tons in 1935 and exports advanced to 13,904 tons from 13,759 tons. Stocks held by the producers at the end of the year dropped to 76,829 tons from 87,346 tons. The apparent consumption of pig iron in Canada during 1936, as computed by deducting the exports from the sum of the production and the imports and allowing for the change in stocks, amounted to 678,804 tons, compared with 573,327 tons in 1935.

Charges to iron blast furnaces in 1936 included 1,218,823 long tons of iron ore, 672,210 short tons of coke, 345,622 short tons of limestone, 49,091 long tons of mill cinder, etc., and 20,386 long tons of scrap.

The four producers of pig iron in Canada have 10 blast furnaces available for use which, if operated at capacity, could produce 1.45 million tons of pig iron per year. Actual production in 1936 at 678,231 tons was about 48 per cent of the rated capacity.

Only 7 of the 10 furnaces were used during the year.

Iron furnaces in blast in January represented 47 per cent of the rated capacity; this percentage declined to 39 for February and March, then improved to 43 and 45 during April, May

and June. The low point of the year at 36 per cent occurred during July and August, after which September showed 49 per cent and the high rate of 60 per cent was attained during October and November. The year closed with 51 per cent of the furnace capacity in blast.

Ferro-Alloys.—Production of ferro-alloys during 1936 amounted to 76,284 long tons compared with 56,616 tons in 1935 and 31,921 tons in 1934.

Nine different plants produced ferrosilicon during 1936; five of these recovered comparatively small tonnages as a by-product from the manufacture of fused alumina, two other companies made ferrosilicon only, one made ferrosilicon in its steel furnace and the other company made ferrosilicon, ferromanganese, spiegeleisen and ferrochrome. Another company made spiegeleisen in an iron blast furnace and a chemical company made some ferrophosphorus.

Imports of ferro-alloys in 1936 totalled 1,000 long tons appraised at \$199,551 against 2,155 tons at \$273,146 in the previous year while exports advanced to 51,574 tons at \$1,531,964 from 38,812 tons at \$1,147,754.

Steel Ingots and Castings.—Steel production advanced 18 per cent in 1936 to 1,115,779 long tons from 941,527 tons in 1935. This year's output included 1,081,549 tons of ingots and 34,230 tons of castings. Practically all of the ingots were transferred to the producers' rolling mills, while the most of the castings were made for sale. The sales of ingots and direct castings were reported at 28,030 tons worth \$4,788,296, compared with sales of 35,392 tons worth \$4,196,922 in the previous year. Transfers to producers' own works amounted to 1,081,741 tons as against 912,075 tons.

Inventories of steel on December 31, 1936, amounted to 23,628 tons of ingots and 1,668 tons of castings, a total of 25,296 tons.

Thirty-one steel plants operated during the year. Four of these works operated basic open hearth furnaces only, 25 used electric furnaces only, 2 used both basic open hearth and electric furnaces and 2 used converters only. Six plants made basic open hearth steel ingots, 4 made electric ingots, 22 made electric steel castings, 3 made basic open hearth castings and 2 made converter castings. These plants reported steel furnace equipment as follows:—42 basic open hearth furnaces with a capacity of 5,090 tons a day, 4 converters rated at 949 tons per day (only 2 of these converters with a capacity of 17 tons per day were operated), and 39 electric furnaces with a capacity of 618 tons.

Rolled and Drawn Steel.—In 1936 there were 13 hot rolling mills in operation, 1 cold rolling plant and 2 works for making cold drawn shapes. Nine of these works were in Ontario, 3 in Quebec, 3 in Nova Scotia and 1 in Manitoba.

Sales from these rolling mills were reported at \$36,054,165, an increase of 20 per cent over the corresponding total of \$29,980,003 in 1935. Merchant bar sales were worth \$8,317,545; plates and sheets \$8,026,825; rails \$4,885,388; wire rods \$3,132,811; blooms, billets and slabs \$2,902,013; structural shapes \$1,835,257; bars for reinforcing concrete \$1,811,779 and rail fastenings \$1,469,887. Horseshoes, forgings, cold rolled and cold drawn steel and miscellaneous rolled products made up the balance of the output.

About 1,215,000 long tons of iron and steel passed through the mills in 1936 and 1,135,000 tons of this came from the producers' own works.

Imports of rolling mill products were valued at \$27,867,397 in the calendar year 1936 against \$24,573,577 in 1935. Shipments from the United Kingdom during this period fell off slightly to \$11,944,306 from \$12,102,715 while purchases from the United States advanced to \$14,694,428 from \$11,538,552.

Prices.—During the first eleven months of 1936, the index for prices of iron and its products advanced only 1.1 to 88.3, but a sharp rise in December for nearly all specifications brought the index up to 91.4. Yearly figures for 1935 and 1936 were 87.2 and 88.0 respectively. Throughout the year orders from the auto manufacturing and the mining industries were the chief sustaining force but increased demand from other sources was also apparent. Pig iron, No. 1 foundry, rose from \$20.50 in 1935 to \$20.58 per long ton carlots f.o.b. sellers' works. Hot rolled and annealed steel sheets No. 10 W.S.G. moved up from \$3.23 to \$3.28 per 100 pounds carlots f.o.b. Montreal, during this period.

Table 158.—Principal Statistics of the Primary Iron and Steel Industry, 1929-1936

Years	Number of plants	Capital employed	Average number of employees	Salaries and wages	Cost of fuel and electricity at works	Cost of materials at works	Selling value of products at works
		\$		\$	\$	\$	\$
1929.....	45	109,446,529	11,218	18,534,681	6,691,961	32,514,596	72,231,995
1930.....	49	112,079,926	9,723	14,934,325	5,182,136	22,765,648	52,588,935
1931.....	53	104,512,104	8,026	11,072,054	3,757,243	15,291,414	36,911,245
1932.....	52	96,323,629	4,847	6,131,057	2,367,122	6,289,483	16,197,526
1933.....	50	96,444,846	5,200	6,049,189	2,699,837	7,598,931	13,492,549
1934.....	51	90,079,004	7,400	9,009,512	3,969,136	12,673,398	29,101,463
1935.....	53	86,465,490	9,523	12,279,390	4,845,559	18,539,072	38,700,961
1936—							
Nova Scotia.....	6	20,112,270	1,996	2,553,168	1,383,934	5,154,383	10,108,447
Quebec.....	14	12,665,789	2,015	2,012,951	592,524	1,989,062	5,074,845
Ontario.....	25	57,527,056	6,686	8,720,512	3,277,151	13,854,120	30,019,258
Manitoba.....	4	1,465,671	327	409,900	157,724	363,138	1,160,667
Alberta.....	1						
British Columbia.....	5	332,988	114	133,846	28,796	63,349	273,675
Canada.....	55	92,103,774	11,138	13,830,377	5,440,129	21,424,052	46,636,892

Table 159.—Production of Pig Iron and Sales by the Producers, 1936

Grades	Total tonnage made	Tonnage shipped to producers' own plants	Sales	
			Quantity	Selling value at works
	long tons	long tons	long tons	\$
Basic.....	530,929	511,375	22,161	495,911
Foundry.....	85,043	2,107	83,552	1,622,190
Malleable.....	62,259	4,390	62,341	1,209,615
Total.....	678,231	517,872	168,054	3,327,716

Table 160.—Materials Charged to Iron Blast Furnaces,* 1936

Materials	Quantity	Cost at furnace
		\$
Foreign iron ore.....long tons	1,218,823	4,010,500
Mill cinder, scale, etc.....long tons	49,091	144,725
Scrap (net charge).....long tons	20,386	177,923
Limestone—		
From Canadian quarries.....short tons	120,275	148,323
From foreign sources.....short tons	225,347	212,333
Coke made in Canada—		
From Canadian coal.....short tons	296,712	1,518,054
From imported coal.....short tons	305,571	1,569,985
Imported coke.....short tons	69,927	500,264
Other materials.....x x x		49,610
Total.....x x x		8,331,717

*In making pig iron.

Table 161.—Imports into Canada and Exports of Pig Iron, 1927-1936

Years	Imports		Exports	
	Long tons	\$	Long tons	\$
1927.....	40,922	781,832	344	7,752
1928.....	43,307	791,733	1,043	20,642
1929.....	32,548	624,891	7,478	151,967
1930.....	13,643	270,157	593	12,653
1931.....	7,912	148,951	2,787	55,183
1932.....	4,753	78,845	2,029	38,816
1933.....	2,459	43,298	11,903	214,195
1934.....	6,419	108,300	9,221	176,093
1935.....	8,920	143,726	13,759	287,396
1936.....	3,960	74,589	13,904	304,682

Table 162.—Blast Furnaces in Canada, 1936

Names of companies	Location of plants	Number of stacks	Total daily capacity (24 hours) (Long tons)	Number of days in blast
Dominion Steel and Coal Corporation Ltd.....	Sydney, N.S.....	1 1 1	350 300 550	366 92 228
Total.....		3	1,200	
Canadian Furnace Co., Ltd.....	Port Colborne, Ont.....	1	350	224
The Steel Co. of Canada, Ltd.....	Hamilton, Ont.....	1 1	275 550	165 366
Total.....		2	825	
Algoma Steel Corp., Ltd.....	Sault Ste. Marie, Ont.....	1 1 1 1	300 300 450 550	 230
Total.....		4	1,600	
Total for Canada.....		10	3,975	

Table 163.—Production of Ferro-Alloys, 1927-1936

Years	Long tons	Years	Long tons
1927.....	56,230	1932.....	16,161
1928.....	44,842	1933.....	30,133
1929.....	89,116	1934.....	31,921
1930.....	65,223	1935.....	56,616
1931.....	46,764	1936.....	76,284

Table 164.—Production of Steel Ingots and Direct Steel Castings, by Grades, 1927-1936
(Long Tons)

Years	Steel Ingots		Direct steel castings			Total steel ingots and castings
	Open hearth	Electric	Open hearth	Converter	Electric	
1927.....	868,440	134	17,569	2,191	19,611	907,945
1928.....	1,189,399	602	20,109	2,019	22,590	1,234,719
1929.....	1,295,162	14,444	35,806	2,590	30,022	1,378,024
1930.....	925,427	30,051	24,772	2,314	27,014	1,009,578
1931.....	612,437	25,017	14,760	590	19,305	672,109
1932.....	308,700	19,670	2,616	846	7,514	339,346
1933.....	378,666	15,393	5,017	288	10,615	409,979
1934.....	713,227	23,891	6,457	507	13,700	757,782
1935.....	872,444	36,742	9,119	645	22,577	941,527
1936.....	1,037,713	43,836	10,208	575	23,447	1,115,779

Table 165.—Materials Used in Steel Furnaces, 1936

Materials	Quantity	Cost of purchased materials
	Long tons	\$
(a) Metals:—		
Pig iron—Own make.....	516,874	
Purchased.....	5,369	123,172
Spiegeleisen and ferromanganese.....	13,448	562,456
Ferrosilicon.....	4,487	213,572
Ferrochrome.....	546	106,961
Other ferro-alloys.....	793	188,969
Scrap iron and steel—Own make.....	265,351	
Purchased.....	428,638	5,007,161
Metals for making alloy steels—Nickel.....	262	136,715
Other metals.....	397	98,332
Total metals.....		6,437,338
(b) Ores:—		
Crude iron ore, imported.....	64,678	293,282
Calcined, roasted, or treated ore, imported.....	29	264
Mangiferous ore, imported.....	159	2,276
Chrome ore, imported.....	324	9,965
Total ores.....	65,190	305,787
(c) General Materials:—	Short tons	
Limestone—		
Canadian.....	42,556	70,716
Foreign.....	66,644	60,677
Fluorspar.....	7,942	88,403
Dolomite.....	43,562	145,502
Magnesite.....	6,432	230,656
Coke made from Canadian coal.....	875	8,699
Coke made in Canada from imported coal.....	314	1,830
Imported coke.....	1,223	12,390
Anthracite coal.....	296	2,585
Bituminous coal.....	200	1,600
Charcoal.....	155	3,639
Electrodes.....		154,727
Mouldings sands.....	21,630	109,914
Sand-blast sand.....	1,790	11,228
Firebrick and fireclay.....		499,598
Other materials.....		626,783
Total General Materials.....		2,028,947
Total value of metals, ores and general materials used.....		8,772,072

Table 166.—Summary of Steel Furnace Capacity in Canada, 1936

Type of furnace	Number of furnaces	Total daily capacity (24 hours)
		(Long tons)
Basic open hearth.....	42	5,090
Electric.....	39	618
Converter.....	4	949
Total.....	85	6,657

DOMINION BUREAU OF STATISTICS

Table 167.—World Production of Pig-Iron and Ferro-Alloys, 1934-1936

(Supplied by Imperial Institute)

(Long tons)

Producing country	1934	1935	1936	Producing country	1934	1935	1936
BRITISH EMPIRE				FOREIGN COUNTRIES— Con.			
United Kingdom.....	5,969,100	6,424,100	7,721,400	Italy.....	572,403	692,718	815,398
Union of South Africa....	128,432	170,746	198,994	Luxemburg.....	1,924,377	1,842,800	1,955,228
Canada.....	436,916	656,491	752,737	Netherlands.....	253,769	249,610	270,542
India.....	1,320,210	1,466,044	1,543,319	Norway.....	124,927	128,686	164,714
Australia (b).....	487,259	698,493	(a)	Poland.....	376,163	387,873	575,152
New Zealand.....	1,337	4,902		Roumania.....	60,662	80,694	95,562
Total.....	8,300,000	9,400,000	10,900,000	Spain.....	366,485	349,172	276,500
FOREIGN COUNTRIES				Sweden.....	548,422	602,001	621,231
Austria.....	131,384	190,119	244,192	U.S.S.R. (Russia).....	10,263,600	12,291,700	14,316,300
Belgium.....	2,905,889	2,981,752	3,111,411	Yugoslavia.....	32,097	21,215	43,751
Czechoslovakia.....	590,843	798,130	1,121,883	Mexico.....	65,408	63,126	86,642
Finland.....	7,457	10,861	12,900	Brazil.....	16,138,573	21,372,699	31,029,187
France—				China.....	57,635	63,070	77,179
Saar.....	1,796,831	(c) 297,422		Japan.....	155,182	(a)	(a)
Other districts.....	6,045,129	5,698,338	6,131,372	Korea.....	1,744,383	1,933,579	2,184,002
Germany.....	8,579,070	12,643,316	15,060,796	"Manchoukuo".....	207,473	241,323	
Hungary.....	138,005	182,947	301,452	Philippine Islands.....	468,285	598,346	639,548
					150	200	200
				Total.....	53,600,000	63,900,000	79,300,000
				World's Total.....	61,900,000	73,300,000	90,200,000

(a) Information not available.

(b) Years ended June 30.

(c) January-February only, after which date production is included with that of Germany.

Table 168.—Production of Steel Ingots and Castings, 1934-1936

(Supplied by Imperial Institute)

(Long tons)

Producing country	1934	1935	1936	Producing country	1934	1935	1936
BRITISH EMPIRE				FOREIGN COUNTRIES— Con.			
United Kingdom.....	8,849,700	9,858,700	11,784,600	Italy.....	1,803,406	2,094,807	1,919,990
Union of South Africa....	11,000	185,100	244,200	Latvia.....	2,076	2,111	2,554
Canada.....	757,782	941,527	1,114,550	Luxemburg.....	1,901,868	1,807,818	1,949,766
India.....	797,569	862,344	865,770	Poland.....	833,829	929,670	1,122,512
Australia (c).....	518,326	696,861	(a)	Roumania.....	172,567	209,721	216,263
Total.....	10,900,000	12,500,000	14,700,000	Spain.....	636,641	576,923	463,583
FOREIGN COUNTRIES				Sweden.....	848,176	882,237	961,922
Austria.....	304,324	358,246	411,790	U.S.S.R. (Russia).....	9,540,100	12,209,000	16,338,200
Belgium.....	2,897,248	2,974,803	3,118,340	Mexico.....	(a)	(a)	110,810
Czechoslovakia.....	925,594	1,159,872	1,514,014	United States (d).....	26,055,289	34,092,594	47,767,856
France—				Brazil.....	61,000	63,217	72,504
Saar.....	1,919,614	(e) 318,438		China.....	50,000	(a)	(a)
Other districts.....	6,076,662	6,177,643	6,602,150	Japan.....	3,782,817	4,628,315	4,944,510
Germany.....	11,510,831	15,889,216	18,459,495	Korea.....	58,755	95,885	
Hungary.....	310,000	443,000	544,000	"Manchoukuo".....		134,656	338,618
				Total.....	69,700,000	85,200,000	107,300,000
				World's Total.....	80,600,000	97,600,000	121,800,000

(a) Information not available.

(c) Years ended June 30.

(d) Excluding steel castings which were produced by companies not manufacturing steel ingots.

(e) January-February only, after which date production is included with that of Germany.

LITHIUM

The principal commercial lithium ores are amblygonite, a fluophosphate of lithium and aluminium; spodumene, a silicate of these two elements, and lepidolite, or lithia mica, also a silicate. The lithia content of these minerals, as mined, commonly ranges around 8 to 9 per cent for amblygonite, 4 to 8 per cent for spodumene, and 3 to 5 per cent for lepidolite. All of the above minerals are known to occur in Canada, but there has, as yet, been only a small production, mainly of lepidolite and spodumene. The important deposits are all in Manitoba in the south-eastern part of the province. The first commercial shipment of Canadian lithium ore to be

officially recorded was reported during the first six months of 1937. This production came from deposits located at Benic Lake, Manitoba, and was valued at \$1,202; the mineral was consigned to the United States for the manufacture of lithium compounds and possibly lithium metal.

Lithium is the lightest solid substance known, being only half as dense as water. According to the United States Bureau of Mines, alloys of lithium and aluminium, lead, zinc, and probably magnesium, appear to be of value in engineering, and lithium may be used as a scavenging agent for iron, copper, nickel and their alloys; lithium-copper and lithium-treated conductivity bronzes are now produced on a fairly large scale, and for a number of years there has been a steady output of lithium-hardened bearing metal alloys. Spodumene has recently attracted some attention for glass making.

Supplies of amblygonite and spodumene in the United States have come principally from South Dakota; during 1936 production of lithium minerals in the United States totalled 1,239 short tons valued at \$25,273.

The following table shows the production of lithium mica in the specified countries for 1933, 1934 and 1935.

	1933	1934	1935
	(long tons)		
South West Africa.....		231	489
France.....	500	1,200	(a)
Germany.....	72	(a)	(a)
Portugal.....	870	294	8

(a) Information not available.

Statistics relating to possible imports of lithium, lithium ores or lithium compounds are not shown separately in Canadian trade reports.

The United States Bureau of Mines reported that prices of amblygonite tended slightly upward in 1936. Although still quoted nominally at \$34 to \$35 per short ton, f.o.b. South Dakota mines, actual sales were made at prices up to \$40 a ton for 8 to 9 per cent material. The price of spodumene is about \$20, f.o.b. South Dakota mines. Lepidolite, per ton, \$20 to \$25, for ordinary grades.

MAGNESIUM

The rapid development of aviation and the growing importance of the air arm for military purposes has caused the question of magnesium production to be seriously regarded in all the more important countries. The metal is not produced commercially in Canada.

Magnesium is reviewed, in part, by the United States Bureau of Mines, as follows—"The world magnesium industry made rapid strides in 1936. Several countries began producing for the first time, and others expanded their output and improved their processes. Germany remained by far the chief producer. Increased activity abroad was due largely to armament and self-sufficiency programs although new commercial uses and improved business conditions also were important factors. In Europe as well as the United States the use of magnesium alloys in aircraft, transportation, and portable equipment is extensive and growing rapidly. The Dow Chemical Company of Midland, Michigan, continued to be the sole producer of magnesium in the United States in 1936; the metal is recovered from natural brines. The principal uses of the metal at present are as a deoxidizer in the metallurgical treatment of other metals and in the manufacture of light alloys. On a volume basis, 1 pound of magnesium equals $1\frac{1}{2}$ pounds of aluminium and about 5 pounds of copper. The high-magnesium alloys are known to the world trade by various names, such as magnalium, Dowmetal, Elektron, A. M. alloys, Bohnalite X, Hydronalium and Maxisum. An improved process for the manufacture of magnesium from magnesite is said to have been developed in Austria. The world producers of magnesium in apparent order of importance are Germany, United States, France, Switzerland, United Kingdom, Japan, Russia, and Austria; a conservative estimate of world production of magnesium in 1936 was 15,000 metric tons."

Data relating to Canadian imports of magnesium metal are not published separately.

United States quotations for magnesium metal (November, 1937) were—per pound, ingots (4x16 in.) 99.8 per cent, 30 cents in carloads; 32 cents in 100 pound lots or more. L.C.L.

MANGANESE ORE

Producers' shipments of manganese ore in Canada during 1936 totalled 221 short tons valued at \$1,596 compared with 100 tons worth \$800 in 1935. The ore in 1936 came entirely from New Brunswick, where shipments to steel plants were made from properties located at Turtle Creek and Gowland Mountain (Elgin) in Albert County.

The Department of Mines, Ottawa, reports that the manganese ores, which have been mined in Canada are pyrolusite, manganite, psilomelane, and bog manganese. These, with the exception of the bog manganese, were mostly ores with a high manganese content and fairly free from deleterious constituents. They were usually in small lots and were derived from various localities in Nova Scotia, New Brunswick and British Columbia. The Nova Scotia Department of Mines stated that during 1936 the Atlantic Manganese Corporation Limited, carried on further work at its property located in the New Ross section of Lunenburg county. The work was confined to the 90 foot level in the number 2 shaft where a drift was carried east for 165 feet following a lead of iron oxide and manganese; no shipments of ore were reported.

The National Association of Purchasing Agents, New York, states in its report A-19, of October, 1936: "It is estimated that more than 90 per cent of the world's consumption of manganese ore is in the manufacture of iron and steel. Most of the manganese ore entering the ferrous metallurgical industry is used in making ferromanganese and spiegeleisen, the forms in which manganese is usually added to steel. Silico-ferromanganese and silicaspiegel are used in certain grades of steel and may replace ferromanganese and spiegeleisen. Considerable manganese ore is also added to the pig-iron blast furnace charge when the iron-ore burdens are deficient in manganese. Manganese steels are utilized in the manufacture of plates, shapes, structural bars, open-hearth rails, spring steels, car wheels, tires, axles and for many other purposes where toughness and resistance to abrasion is required. Manganese is also used in the formation of alloys of copper, zinc, aluminium and other metals. Probably the most extensive chemical use of manganese ore is in the manufacture of dry cells; another outlet taking advantage of the oxidizing power of manganese dioxide is in the glass and ceramic industry; fine glassware is almost entirely decolorized by the addition of manganese oxide. Manganese compounds are used extensively as driers in the preparation of varnish and paint, due to their catalytic properties; manganese ore required for this use must be of relatively high grade. The manufacture of manganates and the permanganates for use as germicides and deodorizers is now an important branch of the chemical industry; the permanganates are also used for bleaching in the textile industry.

In 1936, Canada imported 1,285,242 cwt. of manganese oxide valued at \$684,175 compared with 735,609 cwt. worth \$353,414 in 1935. Of the 1936 imports, 40,073 cwt. valued at \$83,373 came from the United States, 112,000 cwt. valued at \$34,615 came from British South Africa, and 1,132,200 cwt. at \$560,844 came from the Gold Coast.

Table 168(a).—Production of Manganese Ore in Canada, 1923-1936

Years	Tons	Value	Years	Tons	Value
		\$			\$
1923.....	200	1,400	1931.....	117	2,593
1924.....	584	4,088	1932-34.....		
1925-29.....			1935.....	100	800
1930.....	273	1,356	1936.....	221	1,596

"Metal and Mineral Markets", New York, quoted (November, 1937) manganese ore—per long ton unit of Mn., c.i.f. North Atlantic ports, cargo lots exclusive of duty: Brazilian, 46 to 48 per cent Mn., nominal; Chilean, 47 per cent minimum, nominal; Indian 50 to 52 per cent, 45 cents; South African, 50 to 52 per cent, 45 cents. United States manganimiferous ore, 10 per cent Mn., 35 to 40 per cent Fe., 22 cents per unit for manganese content and 5 cents per unit of iron, per long ton, delivered at Birmingham.

Table 169.—Consumption of Manganiferous Ore and Manganese Compounds in Specified Canadian Industries, 1936

Industry	Item	Quantity	Value
		Pounds	\$
Electrical apparatus and supplies.....	Manganese dioxide.....	3,875,978	69,884
Paints, pigments and varnishes.....	Manganese salts.....	236,162	16,573
Steel ingots and castings.....	Ore manganiferous (foreign).....	356,160	2,276
	Spiegeleisen and ferromanganese.	26,896,000	562,456

NOTE.—In addition to the consumption recorded in the table above, a considerable quantity of manganiferous ore is employed in the manufacture of ferro-alloys.

Table 170.—World Production of Manganese Ore(Supplied by *Imperial Institute*)

(Long tons)

Producing Country	1934	1935	1936	Estimated Manganese Content		
				1934	1935	1936
BRITISH EMPIRE						
Gold Coast (shipments).....	365,178	430,659	411,024	190,000	224,000	214,000
Northern Rhodesia.....	2,041	3,976	3,022	581	1,407	774
Union of South Africa.....	64,463	93,943	254,167	24,919	47,253	119,214
Canada.....		89	197		(a)	(a)
India.....	406,306	641,483	813,442	203,000	321,000	407,000
Unfederated Malay States.....	18,876	28,054	36,776	4,400	6,500	8,500
Australia.....	105	148	72	(a)	(a)	(a)
Total.....	860,000	1,200,000	1,520,000			
FOREIGN COUNTRIES						
Bulgaria.....			2,500			1,400
Czechoslovakia.....	58,433	70,306	91,567	10,251	11,995	15,489
Germany.....	507	220	238	(a)	(a)	99
Greece.....	1,187	416	1,653	570	200	578
Hungary.....	10	6,192	26,798	3	2,167	11,100
Italy.....	6,831	8,983	23,751	2,437	2,650	8,450
Portugal.....	290	156	285	120	66	114
Roumania.....	11,867	19,482	3,009	3,886	5,800	1,000
Spain.....	3,736	1,240	(a)	1,200	400	(a)
Sweden.....	6,212	7,114	6,259	2,413	2,661	2,253
U.S.S.R. (Russia).....	1,792,200	2,346,900	2,955,000	(a)	(a)	(a)
Yugoslavia.....	1,086	913	2,696	400	300	1,000
Egypt.....	944	85,924	132,840	500	25,087	38,524
Morocco (French).....	7,161	24,479	29,910	3,200	10,500	13,000
Cuba (b).....	267,115	90,650	151,981	50,750	17,223	30,000
Mexico.....	654	3,166	3,284	(a)	(a)	(a)
Puerto Rico (exports).....	1,711	3,358	3,010	854	1,679	1,505
United States (c).....	26,514	26,428	32,119	11,400	11,400	13,800
Argentina.....	574	432	436	235	180	(a)
Brazil (exports).....	2,264	59,711	163,842	1,100	28,100	77,000
Chile.....	4,000	4,301	(a)	1,880	2,002	(a)
China.....	1,899	1,000	(a)	868	460	(a)
French Indo-China.....		1,543	3,375		643	1,588
Japan.....	56,262	70,527	66,683	28,000	35,000	(a)
"Manchoukuo".....	700	(a)	(a)	300	(a)	(a)
Netherlands East Indies.....	11,451	12,158	8,483	6,012	6,286	4,500
Philippine Islands (exports).....		511	251		245	120
Portuguese India.....	3,800	4,000	2,579	1,900	2,000	1,300
Turkey.....	13	15,350	5,100	4	7,368	1,200
Total.....	2,200,000	2,900,000	3,700,000			
World's Total.....	3,100,000	4,100,000	5,200,000			

(a) Information not available.

(b) Low grade ore before concentration.

(c) Shipments. Excluding the following quantities of ore containing 10 to 35 per cent Mn., which is recorded by the United States Bureau of Mines as iron ore:—

1934.....	23,231 long tons
1935.....	93,291 "
1936.....	98,962 "

(b) Manganese content of manganese ore and manganiferous iron ore.

MERCURY

There has been no Canadian production of new mercury reported since 1897. Previous to this a small output of quicksilver was recorded as having been produced in British Columbia from a property situated on the north shore of Kamloops lake. Cinnabar occurs on the property of the Manitou Mining Co. Ltd., located in the Mud Creek area of the Lillooet mining division in British Columbia; the mineral is found here in sheared greenstone or in massive amygdaloidal greenstone. This property has been reported as active since April 1, 1936, and it was stated in the press in 1937 that the commercial production of mercury ores in British Columbia was a possibility in the near future.

Imports of quicksilver into Canada during 1936 totalled 78,781 pounds valued at \$66,511 compared with 121,741 pounds worth \$98,871 in 1935. Of the 1936 imports, 37,586 pounds at \$37,405 came from the United States and 30,795 pounds worth \$20,896 from Spain.

"Metal and Mineral Markets", New York, quoted quicksilver (November, 1937)—per flask of 76 pounds, \$83 to \$85.

Table 171.—Imports into Canada of Mercury, 1927-1936

Year	Quantity	Value	Year	Quantity	Value
	Pounds	\$		Pounds	\$
1927.....	124,099	160,330	1932.....	43,230	37,068
1928.....	199,603	269,746	1933.....	49,066	35,057
1929.....	346,701	478,048	1934.....	246,892	183,366
1930.....	105,755	153,837	1935.....	121,471	98,871
1931.....	21,159	25,454	1936.....	78,781	66,511

Table 172.—Mercury Consumed in Specified Canadian Industries, 1936

Industry	Quantity	Value
	Pounds	\$
Boiler compounds.....	1,050	970
Medicinal and pharmaceutical preparations.....	90,662	75,319
Other chemicals.....	47,385	41,126

NOTE.—In addition to the consumption specified, there is a considerable quantity of quicksilver employed in the recovery of both placer and lode gold.

Table 173.—World Production of Mercury, 1934-1936

(Supplied by Imperial Institute)

(Pounds)

Producing Country	1934	1935	1936
BRITISH EMPIRE			
Australia (Concentrates).....	167	1,299	5,911
New Zealand.....	3,852	563	.....
FOREIGN COUNTRIES			
Austria.....	.....	.....	220
Czechoslovakia.....	58,052	152,379	142,546
Germany (Hg. content of ore).....	(a) 8,800	(a) 8,800	(a) 8,800
Italy.....	973,061	2,142,893	3,247,409
Roumania.....	139	29	.....
Spain.....	2,416,729	2,702,500	(a) 2,702,500
U.S.S.R. (Russia).....	590,000	(a) 590,000	(a) 590,000
Algeria.....	.....	.....	8,823
Tunis.....	.....	1,764	5,470
Mexico.....	348,161	477,067	403,355
United States.....	1,173,820	1,331,368	1,259,244
Bolivia (exports).....	(c) 50,384	32,040	16,885
China.....	1,200	(a) 1,200	(a) 1,200
Japan.....	14,930	11,219	32,571
Korea.....	.....	306	157
Turkey.....	3,192	1,929	63,504
World's Total.....	5,600,000	6,900,000	(a) 6,900,000

(a) Information not available.

(c) Gross weight, including packing.

MOLYBDENITE

Molybdenite is the principal ore from which the metal molybdenum is reduced. It usually occurs in Canada in pegmatite dykes and on the contacts of limestone and gneiss. Molybdenum is employed chiefly for the manufacture of special alloy steels, the characteristics of which include their power to withstand high temperatures and pressures, corrosion and fatigue. The United States has produced 75 to 90 per cent of the world's supply of new molybdenum during recent years; the relatively small quantities produced in other countries come largely from Mexico and Norway; Chosen, Morocco, Peru and Australia are other producers.

The first commercial shipments of Canadian molybdenite concentrates since 1931 were made during the first six months of 1937. These totalled approximately five tons and were produced by the Phoenix Molybdenite Corporation, Ltd., the property of this company is located in Bagot township, Renfrew county, Ontario, and the production reported in 1937 was exported for treatment to foreign smelters. In 1936, considerable development work was conducted on the "Bain" molybdenite mine located in Masham township, Hull county, Quebec. Near Clinton, British Columbia, the Consolidated Mining and Smelting Company of Canada, Limited, completed a small amount of development work on its Timothy Mountain molybdenite property but no shipments were reported during the year under review.

Imports of calcium molybdate when imported by Canadian manufacturers of steel for use exclusively in the manufacture of steel, in their own factories, totalled 158,621 pounds valued at \$60,363 in 1936 compared with 74,994 pounds at \$26,192 in 1935; imports during both years came entirely from the United States.

Molybdenum ore was quoted in the United States (November, 1937) per pound of contained Mo S₂, nominally 42 cents for 90 per cent concentrate. London, per long ton unit, nominal at 47s. for 90 per cent concentrate.

Table 174.—Production of Molybdenite in Canada, 1925-1936

	Ores treated	Ores and concentrates shipped		MoS ₂ content of shipments
	Tons	Tons	Value (a)	Pounds
1925.....	2,779	15.3	\$ 11,176	22,350
1926.....	4,490	12.6	10,472	20,943
1927.....				
1928.....				
1929.....	2,900	9.5	6,400	16,150
1930.....				
1931.....	12	0.61	280	1,222
1932-1936(*).....				

(a) Value as given by the operators.
(*) It was reported that 200 tons of surface ore were milled during 1934 at a molybdenite property in Renfrew county, Ontario; no shipments were reported. Some 5 short tons of molybdenite concentrates were shipped from the Phoenix mine, Renfrew county, during the first half of 1937.

Table 175.—World Production of Molybdenum Ore, 1934-1936

(Supplied by Imperial Institute)
(In cwt.—112 pounds of concentrates)

Country	1934	1935	1936
BRITISH EMPIRE			
Australia.....	89	212	403
FOREIGN COUNTRIES			
Roumania (Bi-Mo Ore).....		280	900
Yugoslavia.....		363	
Norway (MoS ₂ content).....	4,793	12,736	13,838
French Morocco (MoS ₂ content).....	2,850	2,330	3,800
United States (MoS ₂ content).....	139,315	171,310	255,744
Korea.....	2,037	2,077	1,573
Peru (MoS ₂ content).....	172	194	300
Mexico.....	15,315	22,528	17,522
Japan.....	99	127	120
China (MoS ₂ content).....	22	(a)	(a)

(a) Information not available.
57426—9½

RADIUM-URANIUM

Commercial production of radium-uranium bearing ores in Canada comes at the present time entirely from the Great Bear Lake district in the Northwest Territories. Eldorado Gold Mines Limited, operates a mine and mill at Echo Bay, Great Bear Lake, Northwest Territories, and was the only Canadian producer of pitchblende ores during 1936. Pitchblende concentrates produced by this company are treated for the recovery of radium and uranium at a refinery owned and operated by the company at Port Hope, Ontario. Important quantities of silver also occur with the pitchblende at the Eldorado mine and this metal, in the form of silver concentrates, is principally shipped to the metallurgical works of other firms for the recovery of the silver content.

During 1936 the Eldorado mill treated 22,946.7 tons of ore; from this tonnage the Wilfley, Plat O, Jig, flotation concentrates and cobbled ore produced totalled 401.5 tons with a gross value of \$1,349,388. Production in 1935 was 296 tons valued at \$752,918. For the year ending December 31, 1935, ore reserves were developed to the extent of 17,366 tons. In 1936 the radium production at the Port Hope refinery was at the approximate rate of 2½ grams per month and it was decided to increase the capacity of the refinery to three times the present size. Uranium, which is produced in important quantities at Port Hope from the pitchblende, is widely used in the ceramic industry for the colouring of glass, pottery and enamelware and for obtaining a satisfactory glaze.

The property of the Consolidated Mining and Smelting Company of Canada, Limited, which adjoins the Eldorado mine, was closed down in June. In Ontario, Canadian Radium Mines continued development during the year on their property at Cheddar, near Wilberforce, in northern Hastings county; pegmatite dykes at this property are stated to carry unspecified radioactive minerals; no commercial production was reported by this company.

For statistical purposes, the data relating to the mining and milling and the refining of pitchblende-silver ores in Canada are combined, respectively with those of silver-lead-zinc mining and non-ferrous smelting industries. Figures pertaining to production of radium and uranium in Canada are not published.

Imports into Canada of radium were valued at \$109,032 in 1936 compared with \$150,643 in 1935; statistics relating to imports and exports of uranium or uranium products are not published separately.

Radium was quoted in the United States (November, 1937) per Mg. radium content, \$40.

Table 176.—World Production of Uranium Minerals, 1934-1936

(Supplied by Imperial Institute)

(Cwt. 112 pounds)

Producing Country	1934	1935	1936
BRITISH EMPIRE			
Canada.....	(b)	(b)	(b)
FOREIGN COUNTRIES			
Czechoslovakia (U ₃ O ₈).....	236	311	316
Portugal (U ₃ O ₈).....	158	23	211
United States (U ₃ O ₈).....	70	232	189
Belgian Congo.....	209	250	(a)

Uranium minerals are also produced in Russia.

(a) Information not available.

(b) During 1934, 3,000 mgrms. of radium of 98 per cent average concentration and 27,000 lb. of uranium salts were produced. In 1936 radium production at the Port Hope refinery in Ontario was approximately 2.5 grams per month.

SELENIUM

Selenium production in Canada represents a by-product in the electrolytic refining of blister copper made from Manitoba, Ontario and Quebec ores. It is recovered at Copper Cliff, Ontario, by the Ontario Refining Company, Ltd., and at Montreal East, Quebec, by the Canadian Copper Refiners Ltd. Production during 1936 totalled 350,857 pounds valued at \$621,017 compared with 366,425 pounds worth \$703,536 in 1935. Of the 1936 output, 168,417 pounds were produced from Quebec ores, 106,300 pounds from Ontario nickel-copper ores, 50,760 pounds from the

copper ores of that part of the Flin Flon mine located in Manitoba, and 25,380 pounds from that part of the same mine located on the Saskatchewan side of the interprovincial boundary.

One of the principal uses for selenium is in the manufacture of glass where it has widely replaced manganese for neutralizing colour. It has been, or is, employed in the manufacture of television equipment and apparatus for making printed matter audible to the blind. It is also utilized in the fabricating of rubber, and the production of insecticides, paints, electrical rectifiers, catalysts, and ferroselenium for the steel industry.

General statistics on employment, etc., as relating to the production of both selenium and tellurium are included with those compiled for the Canadian non-ferrous smelting and refining industry, chapter 6. Figures pertaining to Canadian imports and exports of selenium are not published separately.

Selenium was quoted in the United States (November, 1937)—per pound \$2 for black powdered, 99.5 per cent pure.

Table 177.—Production of Selenium in Canada, 1932-1936

Year	Pounds	\$
1932.....		
1933.....	48,221	70,345
1934.....	104,924	171,311
1935.....	366,425	703,536
1936.....	350,857	621,017

SODIUM

According to the United States Bureau of Mines—"Sodium metal itself is far more important as regards tonnage made and used in the United States than are many better-known metals; volume for volume the world output of sodium exceeds that of nickel.¹ Because it is so reactive chemically, sodium is used almost exclusively as a reducing agent in organic-chemical industries. United States production has been estimated at 8,000 to 10,000 tons annually for use mainly in making tetraethyl lead antiknock compounds and in making synthetic indigo. Prices are largely contractual; by January, 1929, the price had gradually receded to 15 cents a pound for contract shipments. A recent innovation is shipment in 40 ton tank cars." No Canadian imports of metallic sodium were recorded in 1936.

TANTALUM

Tantalum metal is not produced in Canada, however, it is interesting to note that the Department of Mines, Ottawa, reports that columbite-tantalite has been found in small quantities in a number of feldspar mines in the Dominion.

Tantalum is malleable, ductile, tough and has a high tensile strength; the metal is very resistant to chemical reagents. It is used as anodes, filaments, etc., in electronic tubes and the carbide is employed in the manufacture of cutting-tool mixture.

Supplies of tantalum ore are obtained almost entirely from the Pilbarra district, Australia; tantalum ores have also been produced recently in the Union of South Africa and South West Africa.

Imports of tantalum ores into the United States in 1936 aggregated 20,758 pounds valued at \$30,751. Canadian trade reports show no imports of tantalum ores or metal into the Dominion during either 1935 or 1936.

Tantalum ore was quoted in the United States, November, 1937, at \$1.00 to \$2.50 per pound Ta_2O_5 , for 60 per cent concentrates; the price depending on source of supply.

TELLURIUM

Production of tellurium in Canada during 1936 totalled 35,591 pounds valued at \$62,997 compared with 16,425 pounds at \$32,850 in 1935. According to origin of the ores, the output in 1936 was credited as follows—Quebec, 19,502 pounds; Ontario, 10,197 pounds; Manitoba, 3,928 pounds, and Saskatchewan, 1,964 pounds.

¹ Fink, C. G., Mining and Metallurgy, Vol. 18, No. 361, 1937.

As with selenium, the metal was recovered in Canada as a by-product in the electrolytic refining of blister copper at Montreal East, Quebec, by Canadian Copper Refiners, Limited, and at Copper Cliff, Ontario, by the Ontario Refining Company, Limited. The production in Ontario represents the recovery of the metal solely from nickel-copper ores, whereas at Montreal East the metal originated in the copper-gold ores of the Flin Flon and Noranda mines of Manitoba-Saskatchewan and Quebec, respectively.

Tellurium has been employed in the purification of zinc solutions in electrolytic plants. It is used in the rubber industry for making latex and for increasing the abrasive resistance and toughness of certain rubber products. In the metal industries it is utilized for the hardening of lead and it is reported that it may also acquire importance in the steel industry.

Data relating to Canadian imports and exports of tellurium are not shown separately in the trade reports for the Dominion. Tellurium was quoted in the United States, November, 1937, at from \$1.75 to \$2.00 per pound.

Table 178.—Production of Tellurium in Canada, 1934-1936

Year	Quantity	Value
	Pounds	\$
1934*.....	5,130	25,599
1935.....	16,425	32,850
1936.....	35,591	62,997

* First commercial production in Canada.

TIN

Tin is known to occur in the Snowflake and Sullivan mines in British Columbia and in certain pegmatites in southeastern Manitoba. It has also been reported at New Ross, Nova Scotia. No tin ore deposits have been worked or tin ore production recorded in Canada during recent years.

"The expansion of industry during 1936 and the prospect of greater expansion in the immediate future, due to the coincidence of rearmament programs in many countries with a normal cyclical trade revival, have not been without their effect on the demand for tin. The tin consuming industries are among those which show the greatest expansion and consumption of tin in many directions is higher than ever before . . . It is a matter of extreme importance, both now and for the future, to record that the International Tin agreement has been renewed for a further period of five years from January 1, 1937. The new agreement is substantially the same in form as the old . . . In the new agreement, standard tonnages for various signatory countries are laid down as follows:—

Belgian Congo.....	13,200
Bolivia.....	46,490
French Indo-China.....	3,000
Malaya.....	71,940
Netherlands East Indies.....	36,330
Nigeria.....	10,890
Siam.....	18,000
Total.....	199,850

"During 1936, world apparent consumption of tin amounted to 157,182 tons, the highest figure for any year since 1930. Production for the year totalled 171,888 tons of which 90.8 per cent came from countries participating in the control agreement."—(The Tin Producers' Association, London.)

The average price for Straits tin—New York, 1936, was 46.441 cents per pound; the average price for the same tin in London was 204.445 pounds sterling per long ton.

Table 179.—Available Statistics on the Consumption of Tin in Specified Canadian Manufacturing Industries, 1935 and 1936

Industries	Items (used)	1935	1936
		Pounds	Pounds
Brass and copper products.....	Ingots.....	254,132	276,414
	Scrap.....	26,954	12,290
	Other.....	33,681	13,533
White metal alloys.....	Pig.....	2,898,077	2,940,320
Iron and steel and their products(*).....	Tin.....	929,373	984,865
Grand Total.....		4,142,217	4,227,422

(*) Includes castings and forgings; boilers, tanks and engines; farm implements; machinery; hardware and tools; sheet metal products; wire; railway rolling stock; heating and cooking apparatus; automobile parts, etc.

Table 180.—Imports of Tin into Canada, 1936

	Pounds	\$
Tin in blocks, pigs or bars.....	4,846,800	2,182,419
Tin foil.....	68,820	26,533
Collapsible tubes.....		63,829
Tin bichloride and tin crystals.....	185,579	46,644
Oxide of tin and copper.....	219,405	77,080
Phosphor tin and phosphor bronze in blocks, bars, plates, etc.....	934,381	240,272
Tin plate food containers.....		201,679
Tin plate containers, n.o.p.....		383,981
Sheets, plate, hoop, etc., tin coated.....	188,611,300	9,184,222
Kitchen and dairy ware—tin coated.....		47,500
Manufactures of tinplate and tin n.o.p.....		406,634

Table 181.—World Production of Tin Ore

(In terms of metal)
(Supplied by Imperial Institute)
(Long tons)

Producing Country	1934	1935	1936
BRITISH EMPIRE			
United Kingdom.....	1,999	2,050	2,099
Nigeria.....	5,000	6,299	9,739
Northern Rhodesia.....		5	5
Southern Rhodesia.....	8	7	47
South West Africa.....	136	164	162
Swaziland.....	114	127	128
Tanganyika Territory.....	103	145	207
Uganda.....	314	397	409
Union of South Africa.....	570	622	634
India.....	4,061	4,102	4,546
Federated Malay States (shipments).....	36,385	40,749	64,719
Unfederated Malay States.....	1,239	1,542	1,979
Straits Settlements.....	51	52	58
Australia.....	2,986	3,130	3,361
Total.....	53,000	59,400	88,100
FOREIGN COUNTRIES			
Germany.....		25	(a)
Portugal.....	530	730	823
Spain.....	102	(a)	(a)
Belgian Congo.....	4,356	6,132	7,303
Cameroon (French).....	150	216	216
Morocco (French).....	39	38	22
Mozambique.....		7	15
Mexico.....	16	621	368
United States.....	8	45	103
Argentina.....	254	700	940
Bolivia (b).....	22,835	25,002	24,091
China (smelter).....	7,878	9,700	10,400
French Indo-China.....	1,133	1,310	1,381
Japan.....	1,821	2,202	2,300
Netherlands East Indies.....	19,680	20,141	30,769
Siam.....	10,157	9,737	12,526
Total.....	69,000	77,000	91,000
World's Total.....	122,000	136,000	179,000

NOTE.—In the case of countries for which assay figures are not published the metal content of the ores has been estimated on the following percentages—South West Africa 70, Swaziland, 70, Uganda 70, India 70, Belgian Congo 70, Japan 70, Siam 72.

(a) Information not available.

(b) Exports.

TITANIUM

Ilmenite, the titanium ore so largely employed in the manufacture of pigments, is known to occur at several places in Canada and commercial shipments of the mineral have been made during past years from deposits located at St. Urbain and Ivry in the province of Quebec. During 1936, Canadian production came entirely from St. Urbain, Quebec, and totalled 2,566 short tons valued at \$18,318; the mineral was consigned to firms manufacturing ferro-alloys and electrical equipment and supplies.

Titanium metal itself has practically no commercial use, however, the element is consumed in increasing quantities in the manufacture of steel, various non-ferrous alloys and castings. It is also employed very largely in the production of titanium pigments. Titanium dioxide in the form of mineral rutile is used in considerable quantities for the making of welding rods and ceramic glasses and to increase fluidity of acid-resisting enamels. In this regard it is interesting to note that rutile occurs in the ilmenite deposits of the St. Urbain area, Quebec.

Imports into Canada of antimony oxide, titanium oxide and white pigments, containing not less than 14 per cent by weight of titanium totalled 4,198,017 pounds valued at \$424,451 in 1936 compared with 2,870,491 pounds at \$310,083 in 1935. Of the 1936 imports, 1,991,527 pounds valued at \$220,927 came from the United Kingdom and 2,172,290 pounds worth \$199,606 came from the United States.

United States quotations for titanium ore (November, 1937) were—per gross ton, ilmenite, 45 to 52 per cent TiO_2 , f.o.b. Atlantic seaboard, \$10 to \$12, according to grade and impurities. Rutile, per pound, guaranteed minimum 94 per cent concentrate, 10 cents, nominal; 88 to 90 per cent, \$55 per ton, c.i.f. New York.

Table 182.—Production of Titanium Ore in Canada,* 1927-1936

Year	Quantity	Value	Year	Quantity	Value
	Short ton	\$		Short ton	\$
1927.....	2,029	8,980	1932.....		
1928.....	2,244	6,732	1933.....		
1929.....	2,748	7,359	1934.....	2,023	14,161
1930.....	412	1,239	1935.....	2,288	16,400
1931.....	1,509	10,261	1936.....	2,566	18,318

* All from Quebec.

Table 183.—Consumption of Titanium Pigments in Canadian Paint Industry, 1931-1936

Years	Pounds	Cost at works	Years	Pounds	Cost at works
		\$			\$
1931.....	745,207	89,761	1934.....	1,710,188	186,678
1932.....	691,304	96,759	1935.....	2,513,026	261,506
1933.....	1,061,249	128,969	1936.....	2,456,265	269,130

NOTE.—Neither titanium white nor titanium alloys are commercially produced in Canada.

Table 184.—World Production of Titanium Minerals, 1934-1936

(Supplied by Imperial Institute, London)

(Long tons)

Producing country and description	1934	1935	1936
BRITISH EMPIRE			
South West Africa—Rutile.....			54
Canada (shipments)—Titaniferous iron ore.....	1,806	2,043	2,291
Federated Malay States—Ilnenite.....	50	2,500	10,300
India—Ilnenite.....	75,644	127,051	140,477
Australia—Ilnenite.....	(b)	(b)	(a)
FOREIGN COUNTRIES			
Norway—Ilnenite.....	25,891	37,384	66,133
Rutile.....	243	122	195
Portugal—Ilnenite.....	434	260	521
Egypt.....	161	180	24
Senegal—Ilnenite.....	500	3,750	3,850
Argentina—Titaniferous iron ore.....	1,000		(a)
Brazil (exports)—Ilnenite and rutile.....	114	282	719
Cameroon (French).....		44	54

NOTE.—Titanium minerals are also produced in the United States, but figures are not available for publication. In recent years, however, the production of ilmenite has been in the order of 1,000 to 5,000 tons, and that of rutile has been several hundred tons.

(a) Information not available.

(b) Zircon-rutile-ilmenite concentrates are produced in New South Wales as follows:—

1934.....	51 tons
1935.....	300 "

but amount of ilmenite or rutile recovered is not recorded.

TUNGSTEN

Several deposits of tungsten-bearing minerals are known to occur in Canada but only comparatively small shipments of tungsten ores have been made, the last being recorded in 1912 and 1917.

At Indian Path, Lunenburg county, Nova Scotia, the Indian Path Mines Ltd., carried on further test work during 1936 in the shaft sunk in the western section of its tungsten property; a crosscut was driven for a short distance north and south of this shaft in order to determine the width of the "belt" at that point.

During 1936 considerable development work of an exploratory nature was conducted on a tungsten bearing deposit located on Hardscrabble Creek, Barkerville mining division, British Columbia. These operations were carried on by Columbia Tungstens Ltd., of New York.

The principal use for tungsten is in the manufacture of high-speed tool steels. It is also employed in certain non-ferrous alloys and special alloy steels. Tungsten carbide cemented with cobalt is used extensively in industry and recent developments include several special grades, including combinations of tungsten carbide and tantalum carbide cemented with cobalt or nickel or both, also combinations of tungsten carbide and titanium carbide cemented with cobalt. Tungsten is also utilized in the making of lamp filaments, radio tube filaments and contact points in electrical apparatus; in the chemical industry it is employed in the manufacture of certain types of dyes (lakes), and mordants.

"Metal and Mineral Markets", New York, quotations for tungsten ore (November, 1937) were—per unit of WO_3 , New York: Chinese Wolframite, \$22, duty paid; quotation nominal. Domestic scheelite, known good analysis, carload lots or more, \$21.50 to \$22. London: Chinese, 65 per cent WO_3 , 60s. to 70s. per unit. South American, 35 to 40 per cent grade, 45s.

Canadian imports of chromium metal and tungsten metal, in lumps, powder, etc., for alloying purposes totalled 140,834 pounds valued at \$60,382 in 1936 compared with 36,007 pounds worth \$22,454 in 1935. Imports in 1936 of metallic elements and tungstic acid for use only in the manufacture of electric lamp filaments were valued at \$86,239 in 1936 against \$85,926 in 1935.

Table 185.—Tungsten Wire, etc., Used in Manufacture of Canadian Electrical Apparatus and Supplies, 1931-1936

Year	Value	Year	Value
	\$		\$
1931.....	79,659	1934.....	48,996
1932.....	53,802	1935.....	52,192
1933.....	48,701	1936.....	47,856

Table 186.—World Production of Tungsten Ore and Concentrates

(Supplied by Imperial Institute)

(Long tons)

Producing Country	1934	1935	1936	Estimated WO ₃ Content		
				1934	1935	1936
BRITISH EMPIRE						
United Kingdom—Concentrates.....	190	219	189	131	151	130
Nigeria—Concentrates.....	5	15	6	3	9	4
South West Africa—Wolfram.....	17	42	38	10	25	27
Scheelite.....		2	2		1	1
Southern Rhodesia—Concentrates.....	106	24	94	69	16	61
Tanganyika Territory—Wolfram.....		5	2		3	1
Union of South Africa—Tungsten ore.....		9	29		6	18
India—Concentrates.....	3,329	3,837	4,552	2,164	2,494	2,959
Federated Malay States—Wolfram.....	29	8	3	19	5	2
Scheelite.....	1,508	1,365	1,364	1,085	983	982
Unfederated Malay States—Wolfram.....	78	274	282	51	178	183
Australia—Wolfram.....	319	441	332	207	287	216
Scheelite.....	7	4	12	4	2	8
New Zealand—Concentrates.....	39	39	28	25	25	18
FOREIGN COUNTRIES						
Portugal—Concentrates.....	579	1,048	1,282	360	666	812
Tin-tungsten ores.....	100	73	109	30	20	36
Spain—Concentrates.....	44	(a)	(a)	29	(a)	(a)
Sweden—Tungsten ore.....			66			36
Mexico.....	73	49	51	47	32	33
United States—Concentrates.....	1,829	2,138	2,332	1,097	1,283	1,399
Argentina—Concentrates.....	360	531	645	252	370	450
Bolivia (exports)—Concentrates.....	782	1,344	1,685	469	840	1,296
Chile—Concentrates.....		6	(a)		4	(a)
Peru—Concentrates.....	11	53	(a)	7	34	(a)
China—Ore.....	6,205	(b)	7,267	(b)	4,360	(b)
French Indo-China—Concentrates.....	272	377	420	179	246	297
Japan—Scheelite.....	64	88	55	42	57	36
Korea—Ore.....	363	861	1,680	236	560	1,092
Netherlands East Indies—Concentrates.....	2	2	1	2	1	1
Siam—Concentrates.....	33	75	(a)	21	49	(a)

Tungsten ores are also produced in U.S.S.R. (Russia).

(a) Information not available.

(b) Exports.

VANADIUM

Some of the magnetites of the Rainy River district in Ontario are known to contain relatively small quantities of vanadium and some research has been conducted as to its economic recovery. There is no production of either the metal or its ores in Canada at the present time.

The principal occurrences of vanadium are in Arizona, Colorado and Utah in the United States; Minasragra in Peru; Broken Hill in Northern Rhodesia; and Grootfontein district in South West Africa.

It is interesting to note that vanadium is now being recovered from boiler and stack soot of ships burning Venezuela and Mexican oil for fuel. It is reported that this soot runs anywhere from 2 to 34 per cent V₂O₅.

Vanadium is consumed chiefly in the steel industry and more particularly in the manufacture of axles, springs, crankshafts and various automobile and locomotive parts. The addition of the metal to steel imparts tensile strength, elastic limit, yield point and impact strength. The salts are of considerable importance in chemical and other industries and the pentoxide has been employed as a catalyst.

Vanadium ore was quoted (November, 1937) by "Metal and Mineral Markets", New York—per pound, V_2O_5 contained, $27\frac{1}{2}$ cents, f.o.b. shipping point. Ferro-vanadium—per pound of V contained, delivered, \$2.70 to \$2.90.

Possible imports of vanadium or vanadium compounds or alloys are not shown separately in Canadian trade reports.

Table 187.—World Production of Vanadium Ores, 1934-1936

(Supplied by *Imperial Institute*)

(Long tons)

Producing country	1934	1935	1936
BRITISH EMPIRE			
Northern Rhodesia—(<i>V content</i>).....	3	170	201
South West Africa.....	324	1,570	4,864
FOREIGN COUNTRIES			
United States (<i>V content</i>).....	(a)	(a)	62
Peru (<i>V content</i>).....			(b) 283

(a) Information not available.

(b) Exports; part may be exported from stocks.

ZIRCONIUM

The metal is not produced in Canada; zircon is the most common zirconium mineral and the Department of Mines and Resources, Ottawa, states that it, or cyrtolite, commonly occurs in greater or less amount in Canadian Precambrian pegmatites, also in the pegmatitic apatite-phlogopite deposits of the Grenville areas in Ontario and Quebec. Brazil has been the chief source of commercial zirconium ore, greatly overshadowing all other occurrences in available reserves and cheapness of exploitation. The ore in Brazil has been called brazilite, apparently a mixture of baddeleyite and zirkelite.

According to the United States Bureau of Mines, the consumption of zirconium compounds has grown rapidly and until 1935 ore was imported into the United States almost exclusively from Brazil; in 1936 British India supplied 1,422 tons valued at \$29.35 per ton; Australia, 3,603 tons valued at \$15.35 per ton, and Brazil, 751 tons valued at \$23.95 per ton.

The United States Bureau of Mines also reports that zirconium-silicon and zirconium-ferro-silicon are developing a gradually growing use in steel making, as superscavengers of oxygen and sulphur for controlling grain size. The extraordinary increase in industrial importance of zirconium, however, is based upon the employment of its compounds in enamels and for electrodes or welding-rod coatings. A particularly interesting development is the new electrical heating element for stoves and furnaces made with granular and milled zircon.

Imports of zirconium silicate into Canada were valued at \$2,547 in 1936 while those of zirconium oxide, during the same year, totalled \$23,133.

"Metal and Mineral Markets", New York, quoted (November, 1937) zircon ore—per ton, 55 per cent ZrO_2 , f.o.b. Atlantic seaboard, carload lots, \$55; 5 ton lots, \$60. Crude granular zircon, \$70, f.o.b. suspension bridge, New York; milled, \$90.

CHAPTER SIX

THE NON-FERROUS SMELTING AND REFINING INDUSTRY IN CANADA

Statistical data relating to operations conducted by the non-ferrous metallurgical industries in Canada during 1936 distinctly reflected the recent and large increase in the production of refined non-ferrous metals and primary metal products in the smelters and refineries of the Dominion.

The gross value of all products totalled \$229,737,420 in 1936 compared with \$186,245,658 in 1935, or an increase of 23.3 per cent. Refined products included gold, silver, copper, lead, zinc, aluminium, cobalt, cadmium, selenium, tellurium, radium salts, uranium compounds, bismuth and sulphur; other end products of individual plants or companies included copper-nickel matte, cobalt and nickel salts and oxides, arsenious oxide, sulphur in sulphuric acid, and elemental sulphur, platinum metals residues, and blister and anode copper.

The estimated cost of ores, concentrates and other material treated during 1936 was \$137,857,432; fuels and purchased electricity consumed totalled \$12,613,763; chemicals and various other process supplies used amounted to \$7,989,580, and the net value of production or value added by processing was estimated at \$71,276,645, an increase of 19.9 per cent above that of the preceding year.

Capital employed in 1936 by the combined firms comprising the industry totalled \$143,858,717; 10,015 employees were reported and \$14,346,050 distributed in salaries and wages.

Among the world producers of copper on a smelting and mine basis, Canada ranked third in 1936, being surpassed only by the United States and Chile. Preliminary data for the same year indicate that the Dominion is now the world's fourth largest producer of the metal in the refined state.

Allocated according to origin of ore, Canada, in 1936, was the fourth largest world producer of lead in the form of base bullion, the output of the Canadian industry being exceeded, in the order of their magnitude, only by those of the United States, Mexico and Australia.

As a world producer of metallic zinc Canada was credited in 1936 with third position, the United States and Belgium being the two leading nations engaged in the reduction of zinc ores; the Dominion, however, ranks second in world importance as a producer of the metal from domestic ores.

According to the Internal Trade Branch of the Bureau, base metals security prices gained more consistently in 1936 than any other group, rising from 214.8 in January to 241.1 for April (1926 = 100). Then, after a minor decline to 239.2, they advanced without interruption to 317.8 for December. Spectacular increases in base metal commodity prices, particularly in the final quarter, furnished considerable support for improvement in base metal stock prices. Gains of the latter, however, were approximately three times as great as those for commodity prices.

Review of the Industry by Provinces

Quebec.—The Aluminum Company of Canada Limited made an important extension to its plant at Arvida; this was for the extraction of alumina from bauxite by the "Bayer" process. In 1936 it was reported that Demerara bauxite from British Guiana is now used at the Arvida plant, the mineral being shipped direct from MacKenzie, British Guiana, to Port Alfred on the Saguenay river; thus the production of aluminium at Arvida is an all-empire enterprise, from mines to finished product. The one plant of the Company located at Arvida was active throughout the year, while aluminium ingot was manufactured at both the Shawinigan Falls and Arvida reduction plants.

During 1936 the Noranda Mines Limited smelter treated 1,120,455 tons of ore, concentrate and refinery slag, and produced 65,376,337 pounds of anodes; after deducting the amount of copper, gold and silver in the refinery slag that was smelted, the estimated production of new

copper, gold and silver was 62,750,342 pounds of fine copper, 342,495 ounces of gold and 543,250 ounces of silver. The concentrator milled 1,070,597 tons of ore from the Horne mine, the average analysis of which was 1.86 per cent copper, 0.137 ounce gold per ton and 0.34 ounce silver per ton from which 179,027 tons of concentrate were produced; the cyanide mill treated 149,700 tons of pyrite from the flotation plant tailing, from which 10,016 ounces of gold were recovered. The tonnage of direct smelting ore delivered to the smelter was 483,895 containing 2.82 per cent copper, 0.370 ounces of gold per ton and 0.46 ounces of silver per ton.

Siliceous fluxing ore delivered to the smelter totalled 455,438 tons containing 0.46 per cent copper, 0.128 ounces of gold per ton and 0.17 ounces of silver per ton.

Steady operations were maintained throughout 1936 by Canadian Copper Refiners Limited at its electrolytic copper refinery located in Montreal East; production at this plant included electrolytic copper, gold, silver, selenium and tellurium.

Ontario.—The International Nickel Company of Canada, Ltd., milled and concentrated 3,317,988 tons of ore in 1936 and the concentrator capacity was enlarged to treat 11,000 tons of ore per day. The Copper Cliff smelter produced 149,000 tons of bessemer matte and 139,796 tons of blister copper. This plant was extended during the year and two reverberatory furnaces and seven converters installed, thus bringing the total smelter equipment to seven reverberatory furnaces and nineteen converters. These additional facilities increase productive capacity by one-third. At the Coniston smelter the four blast furnaces and five converters were operated throughout the year. Ore to the amount of 834,314 tons were processed and 56,827 tons of bessemer matte produced. The nickel refinery of the company, located at Port Colborne, Ontario, operated at capacity throughout the year and produced 103,860,757 pounds of nickel; an addition to this plant, which increased capacity by 50 per cent, was completed during 1936; a small plant was also built for the fabrication of "monel" hot water tanks and range boilers.

The reduction plant of Falconbridge Nickel Mines Limited was in operation 332.6 days in 1936; suspension of operations was forced through the failure of power-supply when the Stinson generating station of Hydro was destroyed by fire in September; smelter extensions were completed during the shutdown. During the year 327,783 tons of ore were treated, of which 126,782 tons were milling grade and 201,001 tons for direct smelting. From this were produced 10,244 short tons of matte containing 5,682.5 short tons of nickel and 2,644.4 short tons of copper. Ore treated was reported to contain 1.90 per cent nickel and 0.92 per cent copper. Adjustments and increases at the smelter embraced the erection of an 18x300 foot reinforced concrete chimney, a new dust chamber and flue system. Sintering capacity was increased, a gas exhausting and dust collecting system installed and a new flue constructed; a new converter was also installed and the blast furnace extended.

Near Goward, in the Temagami Forest Reserve, nickel-copper ores were smelted by Cuniptau Mines Limited and the resultant matte was exported for further treatment in European metallurgical plants.

At Deloro, in Hastings County, the smelter and refinery of the Deloro Smelting and Refining Co. Limited was in continuous operation throughout the year. This company treats silver-cobalt ores from Northern Ontario and produces silver bullion, white arsenic, cobalt metal, cobalt salts and oxides, nickel oxide, and a silver-lead-bismuth bullion.

During 1936 the Port Hope radium refinery of Eldorado Gold Mines Limited constantly increased its production and the company reports that definite evidence is in hand that the processes now in effect are satisfactory, economical and profitable. With the considerable and rather accelerated increase in production which has been required to meet the demands for radium (present production—March, 1937—being at the approximate rate of 2.5 grams per month) the facilities at the refinery were soon strained and it has been decided to treble the capacity of the present refinery. November, 1936, witnessed the completion in production of the first ounce of radium. Uranium is also produced from pitchblende at the Port Hope refinery and the company reports that there is a widespread demand for this product in the ceramic industry in which it is utilized in the colouring of glass, pottery and enamelware and for obtaining a satisfactory glaze. In addition to radium and uranium products the company also recovers important quantities of silver.

Blister copper treated in the electrolytic refinery of the Ontario Refining Co. Limited at Copper Cliff, Ontario, averaged slightly over 12,000 tons per month and operations were above the rated capacity for the first time. There were several new developments during the year, the most important being the installation of a 30 ton arc type electric melting furnace, and a scheme for transporting molten copper from the Copper Cliff smelter to the refinery, a distance of about one mile. Gold, silver, tellurium, selenium, nickel salts and nickel residues are also produced in this refinery.

Manitoba and Saskatchewan.—The copper smelter of the Hudson Bay Mining and Smelting Company Limited is located on or adjacent to the inter-provincial boundary between Manitoba and Saskatchewan. It was operated continuously throughout 1936, treating nearly the same tonnage of pay charge as in the preceding year. All but 135 tons of pay charge was from materials produced by the company. Due to the fact that a considerable tonnage of custom copper concentrates is expected to be received during the latter part of 1937, several alterations were made to increase the capacity of the reverberatory furnace, also a fourth copper roaster installation was completed during the fore part of the year. There was smelted in the reverberatory furnace during 1936 a total of 296,877 tons of Flin Flon ore and concentrates averaging 0.393 ounce of gold per ton, 5.10 ounces of silver per ton and 8.23 per cent copper. There were produced and shipped 22,658 tons of blister copper, with an average assay of gold, 5.004 ounces per ton; silver, 63.48 ounces per ton and copper 98.67 per cent. The average tonnage of new pay material treated per day by the smelter was 812 tons.

There was treated in the cyanide plant a total of 1,073,778 tons of sulphide ore tailings which had an average assay value of gold, 0.0350 ounce per ton and silver, 0.506 ounce per ton; from the treatment of these tailings there were recovered 12,782 ounces gold, 133,105 ounces silver and 53,387 pounds of copper; this material was sent to the copper converters and is included in the blister copper production under the copper smelter.

The electrolytic zinc plant operated continuously throughout the year, producing the largest amount of slab zinc to date; the grade of the electrolytic zinc produced was 99.9901 per cent zinc. The production of die casting zinc, which amounted to 2,098 tons, was almost double that of the preceding year. There was treated during the year in the zinc plant a total of 87,137 tons of zinc concentrates averaging 0.059 ounce of gold per ton, 1.77 ounces of silver per ton, 0.77 per cent copper and 45.5 per cent zinc from which was produced for sale a total of 64,437,820 pounds of slab zinc. There was also produced the usual zinc plant residue which was sent to stockpiles.

The complete cadmium plant was finished and a total of 5,413 dry tons of precipitates drawn from stocks and current production were treated during the year. From this source and the stocks of cathode cadmium on hand there was produced a total of 259,883 pounds of metallic cadmium, which assayed 99.9925 per cent cadmium.

British Columbia.—Consolidated Mining and Smelting Company of Canada Limited reported that the cost of mining and milling a ton of ore was exactly the same as in 1935; the direct cost per pound of recoverable metal was slightly, less due to the grade of the ore extracted, being about three-quarters of one per cent of metal content above 1935. Production in the lead smelting plant was an all-time high record and costs were an all-time low record; lead recoveries were slightly lower than in 1935. Lead production in the refinery increased steadily throughout the year, the tonnage for 1936 being 182,541 tons against 164,329 in 1935, the previous record year. Production in the zinc plant was 118,971 tons against 119,572 tons in 1935. While the cost of zinc in 1936 was .17 cents higher than in 1935, it was more than accounted for in lower silver credit. Zinc concentrates sold increased the zinc production to 125,694 tons; a purer grade of zinc was made and a product carrying 99.995 per cent zinc can be supplied regularly. Cadmium, a by-product metal from zinc reduction, and bismuth, a by-product metal from lead operation, added about \$400,000 to the receipts from the metal sales.

The fertilizer plant has been undergoing several changes to combine the operations of the direct production units with the new sulphur dioxide absorption and recovery plants. Up to 165 tons per day of excellent grade ammonium sulphate have been recovered at a cost slightly above the cost of that made directly from ammonia and sulphuric acid. A remarkably pure elemental sulphur is also obtained from these plants. All the gases from the zinc plant will now be treated, the sulphur from the fumes being recovered as ammonium sulphate, sulphuric acid and elemental sulphur—the last two being interchangeable. When the absorption plant proved

successful, an appropriation was made to build further absorption plants to treat the tail gas from the sulphuric acid plant and to start recovery of the low-grade roaster gas from the lead plant. Two additional units have been added to the hydrogen plant (the limiting plant in the ammonia group), making a 37 ton increase in the ammonia production.

Table 188.—Capital Employed in the Non-Ferrous Smelting and Refining Industry in Canada, 1936

Capital employed as represented by—	\$
(a) Present cash value of the land (excluding minerals).....	6,495,979
(b) Present value of buildings, fixtures, machinery, tools and other equipment.....	95,191,407
(c) Inventory value of materials on hand, ore in process, fuel and miscellaneous supplies on hand.....	18,830,933
(d) Inventory value of finished products.....	5,358,286
(e) Operating capital (cash, bills and accounts receivable, prepaid expenses, etc.).....	17,982,112
Total.....	143,858,717

Table 189.—Principal Statistics of the Non-Ferrous Metallurgical Industry in Canada, 1935 and 1936

	1935	1936
Number of companies.....	12	11
Number of plants.....	14	14
Capital employed.....	\$ 145,686,299	143,858,717
Number of salaried employees.....	935	863
Salaries.....	\$ 2,055,694	2,176,110
Number of wage-earners.....	8,009	9,152
Wages.....	\$ 10,631,662	12,169,940
Value of plant products (gross)†.....	\$ 186,245,658	229,737,420
Estimated cost of ores, concentrates, etc., treated (a).....	\$ 108,081,395	137,857,432
Cost of fuel and purchased electricity (b).....	\$ 11,242,698	12,613,763
Process supplies other than items (a) and (b).....	\$ 7,479,978	7,989,580
Value added by smelting (net).....	\$ 59,441,587	71,276,645

† The gross value of production should not be interpreted as the ultimate sale value of finished metal only, as it represents the combined values of all industrial (smelting, refining, etc.) end products (blister copper, matte, etc.) and in this sense is a duplication of values. Products include gold, silver, platinum metals; blister and anode copper; refined lead, zinc, copper and nickel; nickel-copper matte, nickel oxide, nickel salts, cobalt, cobalt oxide, aluminium, base bullion, cadmium, bismuth, arsenic, tellurium, selenium, radium and uranium salts and oxides and sulphur.

Table 190.—Number of Wage-Earners, by Months, 1932-1936

Month	1932	1933	1934	1935	1936
January.....	5,496	5,003	6,870	7,280	8,660
February.....	5,400	4,831	6,832	7,407	8,544
March.....	5,355	4,926	7,034	7,452	8,665
April.....	4,750	4,890	7,264	7,636	8,694
May.....	4,297	4,010	7,530	7,945	8,858
June.....	4,475	5,534	7,717	7,982	8,912
July.....	4,205	6,080	7,734	8,201	9,406
August.....	4,160	6,322	7,767	8,495	9,606
September.....	4,198	6,368	7,595	8,231	9,626
October.....	4,326	6,478	7,816	8,365	9,623
November.....	4,316	6,396	7,620	8,587	9,542
December.....	4,274	6,410	7,606	8,529	9,669
Average.....	4,604	5,681	7,449	8,009	9,152

Table 191.—Capacities of Canadian Copper Smelting and Refining Works, 1936*

Company	Blast furnaces		Reverberatories		Converters	
	Number	Annual capacity—tons of ore and concentrates	Number	Annual capacity—tons of ore and concentrates	Number	Annual capacity—tons of ore and concentrates
Consolidated Mining & Smelting Co. (b).....			1	48,000	2	16,000
Falconbridge Nickel Mines.....	1	275,000			3	25,000
Hudson Bay Mining & Smelting Co.....			1	325,000	2	
Noranda Mines.....			2	950,000	4	175,000
International Nickel Company.....	4	800,000	7	2,800,000	24	

(*) American Bureau of Metal Statistics.

(b) Idle.

DOMINION BUREAU OF STATISTICS

Table 191.—Capacities of Canadian Copper Smelting and Refining Works, 1936—
Concluded

ELECTROLYTIC COPPER REFINERIES—		Annual capacity—
		short tons
Canadian Copper Refiners Ltd.....		75,000
Ontario Refining Co., Ltd.....		120,000

Copper refining capacities of the world* covering both electrolytic and furnace methods, at the end of 1936 was summarized by the American Bureau of Metal Statistics, as follows:—

	Short tons		Short tons
United States.....	1,642,000	Scandinavia.....	24,000
Canada.....	195,000	Other, Europe.....	160,000
South America.....	368,000	Asia.....	108,000
Germany.....	235,000	Africa.....	97,000
Great Britain.....	210,000	Australia.....	45,000
		Total.....	3,084,000

* Exclusive of Russia and inclusive of capacity for old metal together with new.

Table 192.—Lead Smelting Capacity of Canada

Company	Situation of plant	Number of blast furnaces	Annual capacity (tons of charge)
Consolidated Mining & Smelting Co.....	Trail, B.C....	5	700,000

According to the American Bureau of Metal Statistics, the lead refining capacity of the world in 1936 aggregated about 1,030,000 short tons in the United States and about 2,073,000 elsewhere; there was an increase of about 80,000 tons in capacity during 1936, occurring entirely outside of the United States; probably not more than 900,000 tons of the listed capacity in the United States and 1,500,000 tons elsewhere, a total of 2,400,000 tons, is to be rated as useful and effective, the remainder being obsolete, incapable of economical ore supply, or otherwise useless. Lead refining capacity of some of the more important lead producing countries, other than the United States, expressed in metric tons, are: Canada, 163,300; Mexico, 293,900; Belgium, 137,000; France, 119,700; Germany, 207,000; Great Britain, 165,800; Spain, 263,300; and Australia, 203,000.

Table 193.—Capacity and Production of Electrolytic Zinc Plants in Canada, 1934-1936

	Maximum H.P. used	Estimated annual capacity for cathode zinc (short tons)	Actual production as ingot zinc (short tons)		
			1934	1935	1936
	(a)	(b)			
Consolidated Mining & Smelting Co. of Canada, Ltd...	67,000	143,000	110,217	119,051	119,478
Hudson Bay Mining & Smelting Co., Ltd.....	19,600	35,000	24,714	30,052	32,219

Supplied by the American Bureau of Metal Statistics.

(a) Expressed as power in terms of direct current after transforming the alternating current in sub-stations at the works.

(b) Capacity for ingot zinc may be reckoned at 95% of capacity for cathode deposition.

The American Bureau of Metal Statistics estimates the capacity of American zinc metallurgical works at the end of 1936 as being nominally for the production of 700,000 short tons of spelter per annum by distilling and 204,000 tons by electrolysis, a total of 904,000 tons, but the first-class effective capacity is something less, probably not more than for 850,000 tons, and perhaps materially less than that. The effective capacity outside the United States (exclusive of Russia) at the end of 1936 is estimated at 1,150,000 metric tons whereof about 250,000 tons were in Australia, Canada and Mexico, and about 900,000 tons elsewhere.

CHAPTER SEVEN

THE COAL MINING, COKE, NATURAL GAS, PEAT AND PETROLEUM INDUSTRIES
(Fuels) IN CANADA

The Coal Mining Industry in Canada

1. General Review
2. Commodity Statistics on Coal—including Tables on Output, Disposition, Shipments, Imports into Canada and Exports, Consumption and World Output.

The Coke and Gas Industry in Canada

The Peat Industry in Canada

The Petroleum Industry in Canada

1. Production of Crude Petroleum
2. Production of Petroleum Products

NOTE.—In order to correlate data, regarding fuels in Canada, this chapter has been prepared to include statistics of the coal, natural gas, peat and petroleum industries. This survey presents information in detail regarding these industries as a whole, dealing principally with the mineral industry, although supplementary data are shown for closely allied manufacturing operations.

THE COAL MINING INDUSTRY

The Canadian production of coal in 1936 amounted to 15,229,182 tons valued at \$45,791,934; in the preceding year, 13,888,006 tons worth \$41,963,110 were produced. The 1936 output included 10,796,135 tons of bituminous coal, 566,235 tons of sub-bituminous coal, and 3,866,812 tons of lignite coal. During 1935, bituminous coal production totalled 9,748,841 tons; sub-bituminous coal, 566,425 tons, and lignite coal, 3,572,740 tons.

Nova Scotia continued to be the leading coal producing province with a total output of 6,649,102 tons in 1936 compared with 5,822,075 tons in the previous year. New Brunswick operators reported a production of 368,618 tons or 6.5 per cent above the 1935 total. Output from Manitoba mines advanced to 4,029 tons from the preceding year's production of 3,106 tons. An increase of 10.7 per cent was recorded in Saskatchewan's output in 1936 when 1,020,792 tons were produced against 921,785 tons a year ago. In 1936, Alberta mines produced 5,696,960 tons of coal made up of 2,288,734 tons of bituminous coal, 566,235 tons of sub-bituminous coal, and 2,841,991 tons of lignite coal. During 1935 Alberta mined 2,248,620 tons of bituminous coal, 566,425 tons of sub-bituminous coal, and 2,647,849 tons of lignite coal. Production from British Columbia sources totalled 1,489,171 tons, or 11.9 per cent above the 1935 output. The Yukon coal output declined to 510 tons in 1936 from the 1935 total of 835 tons.

Exports of Canadian coal during 1936 declined 2 per cent to 411,574 tons from the tonnage exported in the previous year. Despite this slight falling-off in exports, the 1936 total was 58.8 per cent higher than the 1933 exportations of 259,233 tons. Clearances through Prince Edward Island, Nova Scotia, New Brunswick, Quebec and Ontario ports in 1936 totalled 277,240 tons, while shipments through Manitoba, Saskatchewan, Alberta, British Columbia and the Yukon ports amounted to 134,334 tons. These export figures include Canadian coal sold for bunkering purposes at Sydney, Nova Scotia, but do not include bunkering figures for other ports.

An advance of 5.6 per cent was recorded in the imports of coal into Canada in 1936 as compared with 1935; the total for the former year was 13,735,040 tons and for the latter, 13,006,021 tons. Anthracite importations in 1936 aggregated 3,530,040 tons and consisted of 1,685,848 tons from the United States, 1,333,602 tons from Great Britain, 359,994 tons from Germany, 88,702 tons from French Indo-China, 44,543 tons from Belgium, 16,231 tons from the Netherlands, and 1,120 tons from China. Great Britain supplied 37.8 per cent of Canada's anthracite requirements during the year under review, 42.1 per cent in 1935, and 46.5 per cent in 1934. The

United States accounted for 47.8 per cent of the 1936 anthracite imports, 48.4 per cent of the 1935 total, and 51.0 per cent of the 1934 importations. Bituminous coal receipts in 1936 advanced 6.8 per cent to 10,200,253 tons; the United States supplied 98.5 per cent of the year's total; Great Britain, 1.4 per cent, and Germany, Norway, Newfoundland, Esthonia, Denmark, Sweden and the Netherlands, the remainder. The United States continued to be the only source of Canada's lignite importations, supplying the Canadian market with 4,747 tons in 1936.

Employment was furnished, on the average, to 25,597 wage-earners by the Canadian coal mines against an average of 24,831 men in 1935. Eastern coal mines employed an average of 14,039 wage-earners and western coal mines, 11,558 men. Surface employees averaged 249 days' work during 1936 and underground workers, 218 days. In addition to these men, there were 1,321 salaried employees on the 1936 mine payrolls. Salaries and wages paid to all employees working in or about the Canadian coal mines in 1936 amounted to \$28,873,135; the 1935 total was \$26,595,344.

Canada's coal supply, computed on the basis of production plus imports less exports, was 28,552,648 tons, or 7.8 per cent higher than the 1935 supply of 26,475,636 tons.

The Canadian fuel requirements are not all supplied by coal, in addition large quantities of coke, natural and artificial gas, fuel oil, wood and electricity are used for industrial and domestic purposes. Coke made available for consumption in Canada in 1936 totalled 2,999,436 tons; this represented an increase of 8.3 per cent over the 1935 total. Canadian producers sold 1,571,232 tons of coke in 1936 of which 18,215 tons were exported. The 1936 sales represented 65.3 per cent of the year's output, the remainder was used by producing companies in their own plants and associated metallurgical works. Coke importations rose 15 per cent to 612,858 tons in 1936. Coke and gas manufacturers in Canada used 1,057,099 tons of Canadian bituminous coal and 2,301,399 tons of imported coal in 1936.

Manufactured gas production in Canada during 1936 reached a total of 44,345,358 thousand cubic feet, or 11.6 per cent above the preceding year's total. In 1936, natural gas consumption in Canada consisted of 17,600,000 thousand cubic feet for domestic purposes and 9,500,000 thousand cubic feet for industrial use. It is estimated that the domestic consumption of natural gas in 1936 resulted in the apparent displacement of 704,000 tons of coal.

The apparent consumption of fuel and gas oils in 1936 totalled 516.2 million imperial gallons compared with 505.8 million imperial gallons in the previous year. The Dominion Fuel Board's survey of fuel oil consumption in Canada during 1936 showed that 111.9 million imperial gallons were used for domestic and building heating; 138.2 million imperial gallons for industrial use; 30.1 million imperial gallons for tractor fuel; 51.9 million imperial gallons for railroads, and 167.1 million imperial gallons for bunkering purposes. A possible coal displacement of 741,000 tons was indicated by the quantity of fuel oil used for domestic heating in 1936.

Table 194.—Capital Employed in the Coal Mines of Canada, by Provinces, 1935 and 1936

Province	1935				1936			
	Capital employed as represented by:				Capital employed as represented by:			
	Cost of lands, buildings, machinery and tools	Cost of supplies and stocks on hand	Cash, trading and operating accounts and bills receivable	Total	Cost of lands, buildings, machinery and tools	Cost of supplies and stocks on hand	Cash, trading and operating accounts and bills receivable	Total
	\$	\$	\$	\$	\$	\$	\$	\$
Nova Scotia.....	38,576,120	2,852,181	4,707,478	46,135,779	36,980,155	3,213,068	5,446,250	45,639,473
New Brunswick...	1,035,803	29,591	263,868	1,329,262	1,026,542	68,517	275,622	1,370,681
Manitoba.....	2,200	.....	.....	2,200	4,400	408	890	5,698
Saskatchewan.....	2,976,292	310,329	282,091	3,568,712	2,605,561	84,628	406,014	3,096,203
Alberta.....	31,405,166	965,471	6,878,578	39,249,215	31,435,333	938,240	8,231,002	40,604,575
British Columbia.	17,301,611	356,752	2,369,366	20,027,729	15,965,370	412,959	2,403,334	18,781,663
Yukon.....	203,000	620	.....	203,620	203,000	1,750	.....	204,750
Canada.....	91,500,132	4,514,944	14,501,381	110,516,517	88,220,361	4,719,570	16,763,112	109,703,043

Table 195.—Employees, Salaries and Wages in the Coal Mines of Canada, by Provinces, 1936

Province	Average number of employees					Salaries and wages		
	Salaried employees		Wage-earners		Total	Salaries	Wages	Total
	Male	Female	Surface	Under-ground				
						\$	\$	\$
Nova Scotia.....	435	54	2,033	10,848	13,370	825,954	13,291,656	14,117,610
New Brunswick.....	32	6	258	900	1,196	71,121	768,025	839,146
Manitoba.....			4	11	15		3,915	3,915
Saskatchewan.....	55	4	254	593	906	92,972	600,197	693,169
Alberta.....	537	36	2,131	5,923	8,627	1,164,516	8,493,359	9,657,875
British Columbia.....	148	14	830	1,809	2,801	386,890	3,173,091	3,559,981
Yukon.....			1	2	3		1,439	1,439
Canada.....	1,207	114	5,511	20,086	26,918	2,541,453	26,331,682	28,873,135

Table 196.—Wage-earners Employed and Days' Work Done, by Months, in the Coal Mines of Canada, 1936, with Comparative Totals for 1935

Month	Number of wage-earners			Days' work done		
	Surface	Under-ground	Total	Surface	Under-ground	Total
January.....	5,696	21,490	27,186	118,021	381,118	499,139
February.....	5,757	21,335	27,092	122,078	389,950	512,028
March.....	5,532	20,286	25,818	101,812	298,822	400,634
April.....	4,966	18,642	23,638	92,662	283,165	375,827
May.....	4,904	17,685	22,589	97,388	306,701	404,089
June.....	5,027	17,728	22,755	100,373	320,909	421,282
July.....	5,063	17,610	22,673	102,954	332,151	435,105
August.....	5,285	18,837	24,122	106,958	333,836	440,794
September.....	5,885	20,878	26,763	129,549	421,757	551,306
October.....	6,088	22,085	28,173	146,701	490,548	637,249
November.....	5,978	22,207	28,185	128,878	414,965	543,843
December.....	5,926	22,247	28,173	127,606	408,013	535,619
Total for 1936.....				1,374,980	4,381,935	5,756,915
Total for 1935.....				1,312,667	4,069,853	5,382,520

Table 197.—Output of Coal in Canada, by Grades, 1927-1936

Calendar year	Bituminous		Sub-Bituminous		Lignite		Total		Average per ton
	Short tons	Value	Short tons	Value	Short tons	Value	Short tons	Value	
		\$		\$		\$		\$	
1927.....	13,006,996	49,385,818	596,155	1,784,973	3,823,710	10,696,672	17,426,861	61,867,463	3.55
1928.....	12,971,744	50,584,108	740,496	2,076,212	3,852,053	11,097,513	17,564,293	63,757,833	3.66
1929.....	12,859,822	49,995,261	668,702	1,908,954	3,968,033	11,160,955	17,496,557	63,065,170	3.60
1930.....	10,824,839	41,789,061	603,358	1,705,236	3,453,127	9,355,451	14,881,324	52,849,748	3.55
1931.....	8,861,360	33,165,730	471,343	1,211,197	2,910,508	6,830,755	12,243,211	41,207,632	3.37
1932.....	7,714,279	28,073,744	560,902	1,329,316	3,463,732	7,714,635	11,738,913	37,117,695	3.16
1933.....	7,979,283	27,757,150	554,118	1,274,017	3,369,943	6,892,795	11,903,344	35,923,962	3.02
1934.....	10,058,782	34,356,274	537,508	1,256,936	3,213,903	6,432,732	13,810,193	42,045,942	3.04
1935.....	9,748,841	33,150,781	566,425	1,410,926	3,572,740	7,401,403	13,888,066	41,963,110	3.02
1936.....	10,796,135	36,256,347	566,235	1,432,741	3,866,812	8,102,846	15,229,182	45,791,934	3.00

Table 198.—Output and Value of Coal in Canada, by Kinds and by Provinces, 1935 and 1936

(Short tons)

Province	1935			1936		
	Number of mines	Quantity	Value	Number of mines	Quantity	Value
			\$			\$
NOVA SCOTIA (Bituminous).....	39	5,822,075	20,391,227	39	6,649,102	22,973,281
NEW BRUNSWICK (Bituminous).....	22	346,024	1,129,019	27	368,618	1,190,032
MANITOBA (Lignite).....	2	3,106	7,408	2	4,029	9,525
SASKATCHEWAN (Lignite).....	*158	921,785	1,293,668	*161	1,020,792	1,463,680
ALBERTA—						
Bituminous.....	16	2,248,620	6,583,542	17	2,288,734	6,597,323
Sub-bituminous.....	19	566,425	1,410,926	18	566,235	1,432,741
Lignite.....	†278	2,647,849	6,100,327	†266	2,841,991	6,629,641
Total.....	313	5,462,894	14,094,795	301	5,696,960	14,659,705
BRITISH COLUMBIA (Bituminous).....	21	1,331,287	5,043,510	22	1,489,171	5,493,425
YUKON (Bituminous).....	1	835	3,483	1	510	2,286
Canada—						
Bituminous.....	99	9,748,841	33,150,781	106	10,796,135	36,256,347
Sub-bituminous.....	19	566,425	1,410,926	18	566,235	1,432,741
Lignite.....	438	3,572,740	7,401,403	429	3,866,812	8,192,846
Total.....	556	13,888,006	41,963,110	553	15,229,182	45,791,934

*Exclusive of 35 small mines in operation during part of 1935 and 47 small mines operating during part of 1936.

†Exclusive of 8 small mines operated under special permits in 1935 and 31 small mines in 1936.

Table 199.—Disposition of Coal from Canadian Mines, 1935 and 1936

	1935			1936						
	Total coal	Total value	Average value per ton	Run-of-mine	Lump	Nut and other grades	Slack	Total coal	Total value	Average value per ton
	Tons	\$	\$	Tons	Tons	Tons	Tons	Tons	\$	\$
Supplied to employees for domestic consumption	134,891	540,651	2.92	126,990	49,231	6,129	948	183,298	518,615	2.83
Used for power purposes—										
(a) Ships.....	89,879	302,549	3.37	1,721	317	19,764	70,717	92,519	369,428	3.99
(b) Colliery boilers.....	553,279	1,458,243	2.64	121,539	6,433	58,134	378,163	564,269	1,461,518	2.59
(c) Companies' railroads.....	62,440	228,651	3.66	41,253	10,993	7,096	.....	59,342	215,060	3.62
(d) Harbour tugs and dredges.....	353	790	2.24	1,306	.....	.....	.....	1,306	4,271	3.27
Shipped. (See Table 201)—										
(a) Ships' bunkers.....	427,850	39,205,653	3.09	278,194	96,174	44,073	2,141	420,582	42,422,160	3.06
(b) Railroads.....	3,891,002			2,675,006	569,162	28,293	64,996	3,337,459		
(c) Other.....	8,357,507			904,169	3,779,342	1,470,143	3,938,613	10,092,267		
Used in making coke at colliery.....	139,872	317,533	2.27	.....	.....	.....	149,713	149,713	352,764	2.36
Used in making briquettes.....	17,621	57,012	3.23	.....	.....	.....	19,471	19,471	63,281	3.25
Put on bank.....	1,347,492	4,497,534	3.34	488,674	145,686	20,249	702,443	1,357,052	4,402,264	3.24
Put on waste heap.....	204,182	.....	.....	.....	.....	.....	.....	216,429	.....	.....
Total disposition.....	15,276,368	46,608,616	3.05	4,638,852	4,657,338	1,653,883	5,327,205	16,493,707	49,809,361	3.01
Lifted from bank.....	1,383,079	4,645,506	3.36	125,851	442,291	19,034	668,460	1,255,636	4,017,427	3.20
Lifted from waste heap.....	5,283	.....	.....	.....	.....	.....	.....	8,889	.....	.....
Total output.....	13,888,006	41,963,110	3.02	4,513,001	4,215,947	1,634,849	4,658,745	15,229,182	45,791,934	3.01

Table 200.—Disposition of Coal from Canadian Mines, by Provinces, 1936

(Short tons)

	Nova Scotia	New Brunswick	Manitoba	Saskatchewan	Alberta	British Columbia	Yukon	Canada
Supplied to employees for domestic consumption.....	117,264	3,887		3,031	41,927	17,187	2	183,298
Coal shipped. (See Table 201)...	6,001,760	361,450	3,856	967,608	5,314,521	1,201,038	75	13,850,308
Used under colliery boilers, etc...	276,806	2,333	173	23,159	149,556	112,232	10	564,269
Used by companies' railroads.....	40,699	1,240		7,844	6,674	2,885		59,342
Used for manufacture of coke at colliery.....					97,353	52,360		149,713
Used in making briquettes.....					19,471			19,471
Used in shops, etc.....	92,519							92,519
Used by harbour tugs and dredges.....	1,306							1,306
Put on bank.....	1,225,545	17,984		6,204	55,972	51,172	175	1,357,052
Put on waste heap.....	26,030	709		17,271	79,771	92,375	273	216,429
Total disposition.....	7,781,929	387,603	4,029	1,025,117	5,765,245	1,529,249	535	16,493,707
Lifted from bank.....	1,131,162	18,985		4,325	61,181	39,958	25	1,255,636
Lifted from waste heap.....	1,665				7,104	120		8,889
Total output.....	6,649,102	368,618	4,029	1,020,792	5,696,960	1,489,171	510	15,229,182

Table 201.—Shipments of Coal from Canadian Mines, by Grades and by Destinations, 1935 and 1936

(Short tons)

Destination	1935					1936					
	Run-of-mine	Lump	Nut and other grades	Slack	Total	Run-of-mine	Cobble	Lump	Nut and other grades	Slack	Total
Prince Edward Island.....	10,288	50,834	.....	10,172	71,294	5,948	.....	49,073	4,343	11,333	70,697
Nova Scotia..	144,045	353,668	.....	756,307	1,254,020	151,325	.....	332,637	20,705	841,965	1,346,632
New Brunswick.....	110,675	85,345	.....	270,407	466,427	171,060	.....	99,840	12,582	299,313	582,795
Quebec.....	16,483	546,103	.....	1,196,752	1,759,338	39,804	.....	1,104,770	154,669	1,590,045	2,889,288
Ontario.....	490	55,233	.....	20,359	86,157	1,284	135	77,384	21,307	30,205	130,315
Manitoba.....	75,286	309,392	.....	340,914	943,950	54,640	83,378	251,452	278,937	318,231	986,638
Saskatchewan.....	223,887	813,166	.....	219,374	1,600,732	208,006	107,490	787,417	423,666	247,854	1,774,433
Alberta.....	193,981	477,630	.....	252,173	1,216,158	227,574	.....	512,553	302,730	283,165	1,326,622
British Columbia...	18,158	414,899	.....	141,055	688,558	29,856	.....	238,926	223,576	205,887	698,245
Yukon.....	.....	.....	.....	310	310	.....	.....	.....	75	.....	75
Total domestic shipments.....	793,293	3,106,270	.....	979,868	8,086,944	889,497	191,003	3,454,052	1,442,590	3,827,998	9,805,140
Railroads—	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
In Canada.....	2,588,061	1,136,573	.....	21,552	3,863,122	2,663,368	.....	565,164	27,832	64,996	3,321,360
In United States.....	10,571	.....	.....	.....	10,571	11,638	.....	326	463	.....	12,427
In Newfoundland.....	.....	17,309	.....	.....	17,309	.....	.....	6,386	.....	.....	6,386
Ships' bunkers	275,189	135,781	.....	15,056	427,850	278,194	.....	96,174	44,073	2,141	420,582
Total railroads and ships' bunkers.....	2,873,821	1,289,663	.....	36,608	4,318,852	2,953,200	.....	668,050	72,368	67,137	3,760,755
United States.....	5,368	25,295	.....	14,126	119,204	2,682	.....	23,889	27,428	110,367	164,366
Alaska.....	.....	14,895	.....	318	15,213	.....	.....	12,588	125	.....	12,713
Newfoundland.....	12,922	108,969	.....	9	121,900	11,839	.....	91,632	.....	248	103,719
Lith countries.....	125	7,401	.....	.....	7,526	151	.....	3,464	.....	.....	3,615
Lost at sea.....	.....	6,720	.....	.....	6,720	.....	.....	.....	.....	.....	.....
Total external shipments.....	18,415	163,280	.....	14,444	270,563	14,672	.....	131,573	27,553	110,615	284,413
Total.....	3,685,529	4,559,213	1,030,920	3,400,697	12,676,359	3,857,369	191,003	4,253,675	1,542,511	4,005,750	13,850,308

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Table 202.—Imports of Anthracite and Bituminous Coal into Canada from Great Britain, by Grades and by Provinces, 1935 and 1936

(Short tons)

Destination	1935				1936			
	Anthracite			Bituminous, all grades	Anthracite			Bituminous, all grades
	Grate, egg, stove, nut and pea	Screenings or dust	N.O.P.		Grate, egg, stove, nut, doubles, cobble and trebles	Screenings or dust	Peas, beans and smaller sizes, n.o.p.	
Prince Edward Island.	3,400			4,142	5,224			5,576
Nova Scotia.....	49,477		592	54,506	41,218		2,410	40,940
New Brunswick.....	49,249			22,809	70,327		3,212	22,253
Quebec.....	1,234,266	55,266	30,665	296,281	741,766		417,766	77,670
Central Ontario.....	29,657			860	32,185		19,318	
Head of Lakes.....								
Manitoba.....	11		370	931	176			619
Saskatchewan.....								
British Columbia.....			1,568	1,116				662
Canada.....	1,366,060	55,266	33,195	380,645	890,896		442,706	147,720

Table 203.—Imports of Anthracite, Bituminous and Lignite Coal into Canada from the United States, by Grades and by Provinces, 1935 and 1936

(Short tons)

Destination	1935					1936				
	Anthracite			Bitu- minous, all grades	Lignite	Anthracite			Bitu- minous, all grades	Lignite
	Grate, egg, stove, nut and pea	Screen- ings or dust	N.O.P.			Grate, egg, stove, nut, doubles, cobble and trebles	Screen- ings or dust	Peas, beans and smaller sizes n.o.p.		
Prince Edward Island....	1,454			125		1,479			111	
Nova Scotia.....	7,370			48		7,534			2	
New Brunswick.....	18,885		86	11,989		14,740		339	16,854	
Quebec.....	247,005	7,951	61,606	459,761		208,196	3	53,446	645,006	
Ontario.....	1,208,188	3,193	108,795	8,682,867		1,243,593	7,814	142,908	9,361,758	
Manitoba.....	717		4,754	8,987	396	1,345		4,363	13,482	168
Saskatchewan.....			49	952	182	27		31	847	20
Alberta.....				1,136	39				1,205	33
British Columbia.....			32	2,543	4,629		30		2,801	4,526
Yukon.....				20					61	
Canada.....	1,483,619	11,144	175,322	9,168,428	5,246	1,476,914	7,847	201,087	10,042,127	4,747

Table 204.—Imports of Anthracite and Bituminous Coal into Canada from Other Countries, by Provinces, 1935 and 1936

(Short tons)

Destination	Source	1935				1936			
		Anthracite			Bituminous, all grades	Anthracite			Bituminous, all grades
		Grate, egg, stove, nut and pea	Screen- ings or dust	N.O.P.		Grate, egg, stove, nut, doubles, cobbles and trebles	Screen- ings or dust	Peas, beans, and smaller sizes, n.o.p.	
Nova Scotia.....	Germany.....	3,366				792		3,249	2,321
Quebec.....	Germany.....	201,679				318,327	58	37,567	7,100
	Belgium.....	67,220				37,055		7,488	
	Netherlands.....					8,951			35
	French Indo-China.....	24,687				31,103		57,599	
	Norway.....				285				361
	Sweden.....								45
	Denmark.....								124
	Esthonia.....				55				134
	Newfoundland.....								286
	Poland.....				1				
Central Ontario.....	Netherlands.....							7,280	
	French Indo-China.....	29,760							
British Columbia.....	Germany.....					1			
	Alaska.....				43				
	China.....					1,120			
Canada.....		326,712			384	397,349	58	113,183	10,406

Table 205.—Average Imports of Coal into Canada, by Kinds and by Provinces, for the Five Years, 1932-1936

(Short tons)

Destination	Total anthracite	Total bituminous	Lignite	Total all grades
Prince Edward Island.....	6,342	3,984		10,326
Nova Scotia.....	58,881	51,995		110,876
New Brunswick.....	92,483	31,408		123,891
Quebec.....	1,849,845	769,991		2,619,836
Central Ontario.....	1,312,921	7,819,282		9,132,203
Head of Lakes.....	11,032	696,638		707,670
Total Ontario.....	1,323,953	8,515,920		9,839,873
Manitoba.....	5,458	12,327	253	18,038
Manitoba and Head of Lakes.....	16,490	708,965	253	725,708
Saskatchewan.....	32	1,164	116	1,312
Alberta.....	16	1,094	16	1,126
British Columbia.....	1,478	7,817	3,314	12,609
Yukon.....		26		26
Canada.....	3,338,488	9,395,726	3,699	12,737,913

Table 206.—Exports of Canadian Coal, by Destinations, 1934-1936

(Compiled in the *External Trade Branch*)

Destination	1934		1935		1936	
	Short tons	Value	Short tons	Value	Short tons	Value
		\$		\$		\$
BRITISH EMPIRE						
United Kingdom.....	21,158	112,653	35,413	206,996	30,867	169,122
Irish Free State.....	1,865	9,437	1,837	9,224	8,781	43,450
British South Africa.....	6,989	34,102	3,832	18,597	3,174	15,390
Bermuda.....	1,094	5,223	804	3,934	1,569	7,583
British Guiana.....			2,193	10,243		
British West Indies—						
Barbados.....	1,235	5,623				
Jamaica.....	200	1,500			52	364
Trinidad and Tobago.....	970	4,553	1,079	5,395		
Other British West Indies.....	1,184	5,516				
Gibraltar.....					2,098	10,385
Newfoundland.....	102,544	470,966	128,169	577,241	94,314	429,107
Sierra Leone.....	1,111	6,187	4,583	22,296	6,804	31,743
Australia.....	22,126	135,220	15,891	95,666	7,773	47,097
New Zealand.....	5,004	22,518	13,320	62,338	12,318	57,736
Total British Empire.....	165,480	812,501	207,121	1,011,930	167,750	811,967
FOREIGN COUNTRIES						
Argentina.....			5,559	26,584	5,696	26,338
Belgium.....	2,415	11,849	2,433	12,216	7,708	37,922
Brazil.....			1,420	6,765		
Chile.....	994	4,647				
China.....	834	4,916	3,473	25,395	1,225	9,187
Cuba.....	1,896	8,890	2,527	12,203	1,880	9,242
Denmark.....			1,308	6,453	298	1,478
Finland.....					471	2,355
France.....	5,150	25,976	4,699	24,207	3,144	15,916
French Possessions—						
French Africa.....			123	615		
St. Pierre and Miquelon.....	1,325	7,241	4,448	19,298	5,192	23,947
Germany.....					1,584	7,773
Greece.....			314	1,570	1,203	5,902
Iceland.....					300	1,488
Italy.....			2,800	14,165	1,504	7,481
Japan.....	1,614	7,458	982	7,365	1,038	7,481
Morocco.....					2,107	10,159
Netherlands.....	2,394	11,739	1,713	8,394	1,925	9,457
Norway.....			2,689	12,534	3,434	17,117
Panama.....	1,063	4,784				
Peru.....			252	1,259		
Poland and Danzig.....	305	1,449	424	2,120	405	1,986
Russia (U.S.S.R.).....	2,400	18,000				
San Domingo.....	297	1,473	623	2,991		
Spain.....	199	995	267	1,330	379	1,895
Sweden.....	185	925	280	1,392	563	2,789
United States.....	107,162	396,728	161,804	611,990	193,646	714,695
Alaska.....	12,622	81,407	12,889	94,656	10,122	66,009
Puerto Rico.....			243	1,215		
Total foreign countries.....	140,855	588,477	211,270	894,717	243,824	980,617
Total.....	306,335	1,400,978	418,391	1,906,647	411,574	1,792,584

Table 207.—Annual Consumption of Coal in Canada, 1927-1936

Calendar year	Canadian*		Imported coal "entered for consumption"				Total	Per capita
			From U.S.A.	From Great Britain	Total†			
	Short tons	%	Short tons	Short tons	Short tons	%	Short tons	Short tons
1927.....	15,944,983	46.7	17,266,434	907,220	18,177,303	53.3	34,122,286	3.541
1928.....	16,487,807	50.0	15,830,688	682,755	16,515,582	50.0	33,003,389	3.356
1929.....	16,387,461	48.0	16,780,452	843,502	17,724,132	52.0	34,111,593	3.401
1930.....	14,052,671	43.3	16,971,933	1,144,861	18,412,039	56.7	32,464,710	3.180
1931.....	11,682,779	47.7	11,793,798	987,442	12,828,327	52.3	24,511,106	2.362
1932.....	11,212,701	49.0	9,889,866	1,727,716	11,654,492	51.0	22,867,193	2.177
1933.....	11,456,273	51.5	8,865,935	1,942,875	10,808,962	48.5	22,265,235	2.085
1934.....	13,236,406	51.1	10,580,710	1,981,116	12,651,168	48.9	25,887,574	2.392
1935.....	13,306,303	53.1	9,618,518	1,822,500	11,735,835	46.9	25,042,138	2.290
1936.....	14,508,652	53.3	10,801,643	1,498,656	12,719,515	46.7	27,228,167	2.469

* The sum of Canadian coal mine sales, colliery consumption, coal supplied to employees, and coal used in making coke etc., less the tonnage of coal exported.

† Includes small tonnages from countries other than Great Britain and the United States. Deductions have been made to take account of foreign coal re-exported from Canada and bituminous coal ex-warehoused for ships' stores.

Table 208.—Summary Statistics for 1936—Output, Exports, Interprovincial Shipments,* Imports and Coal made Available for Consumption in Canada, by Provinces
(Short tons)

Province	Canadian coal				Im- ported from U.S.A.	Im- ported from Great Britain	Im- ported from Ger- many	Im- ported from Bel- gium	Im- ported from French Indo- China	Im- ported from Other coun- tries	Coal available for con- sumption
	Output	Received from other provinces	Shipped to other provinces	Ex- ported							
PRINCE EDWARD Island—											
Anthracite.....					1,479	5,224					6,703
Bituminous.....		82,559		5	111	5,576					88,241
Total.....		82,559		5	1,590	10,800					94,944
NOVA SCOTIA—											
Anthracite.....					7,534	43,628	4,041				55,203
Bituminous.....	6,649,102		3,861,460	202,503	2	40,940	2,321				2,628,402
Total.....	6,649,102		3,861,460	202,503	7,536	84,568	6,362				2,683,605
NEW BRUNSWICK—											
Anthracite.....					15,079	73,539					88,618
Bituminous.....	368,618	527,678	24,312	74,603	16,854	22,253					836,488
Total.....	368,618	527,678	24,312	74,603	31,933	95,792					925,106
QUEBEC—											
Anthracite.....					261,645	1,159,532	355,952	44,543	88,702	8,951	1,919,325
Bituminous.....		3,241,150	1,011,511	18	645,006	77,670	7,100			985	2,960,382
Sub-bituminous.....											
Total.....		3,241,150	1,011,511	18	906,651	1,237,202	363,052	44,543	88,702	9,936	4,879,707
CENTRAL ONTARIO—											
Anthracite.....					1,377,965	51,503				7,280	1,436,748
Bituminous.....		1,050,490		27	8,516,579						9,567,042
Sub-bituminous.....		21,846									21,846
Lignite.....		49,748		84							49,664
Total.....		1,122,084		111	9,894,544	51,503				7,280	11,075,300
MANITOBA AND HEAD OF LAKES—											
Anthracite.....					22,058	176					22,234
Bituminous.....		260,813		575	858,661	619					1,119,513
Sub-bituminous.....		76,449									76,449
Lignite.....	4,029	665,635		545	168						669,287
Total.....	4,029	1,002,897		1,120	880,887	795					1,887,488
SASKATCHEWAN—											
Anthracite.....					58						58
Bituminous.....		72,450		398	847						72,899
Sub-bituminous.....		20,756									20,756
Lignite.....	1,020,792	1,159,754	443,013	3,360	20						1,734,193
Total.....	1,020,792	1,252,960	443,013	3,758	925						1,827,906
ALBERTA—											
Anthracite.....											
Bituminous.....	2,288,734	11,424	338,095	666	1,205						1,962,602
Sub-bituminous.....	566,235		157,891								408,344
Lignite.....	2,841,991		1,507,221	1,353	33						1,333,450
Total.....	5,696,960	11,424	2,003,207	2,019	1,238						3,704,396
BRITISH COLUMBIA—											
Anthracite.....					30		1			1,120	1,151
Bituminous.....	1,489,171	131,009	142,195	122,334	2,801	662					1,359,114
Sub-bituminous.....		38,840									38,840
Lignite.....		75,097		5,102	4,526						74,521
Total.....	1,489,171	244,946	142,195	127,436	7,357	662	1			1,120	1,473,626
YUKON—											
Bituminous.....	510			1	61						570
Total.....	510			1	61						570
CANADA—											
Anthracite.....					1,685,848	1,333,602	359,994	44,543	88,702	17,351	3,530,040
Bituminous.....	10,796,135	4,366,062	4,366,062	401,130	10,042,127	147,720	9,421			985	20,595,258
Sub-bituminous.....	566,235	157,891	157,891								566,235
Lignite.....	3,866,812	1,950,234	1,950,234	10,444	4,747						3,861,115
Total.....	15,229,182	6,474,187	6,474,187	411,574	11,732,722	1,481,322	369,415	44,543	88,702	18,336	28,552,648

* Direct imports into each province. See text for interprovincial shipments of imported coal.

† Includes 1,011,511 tons Nova Scotia coal shipped to Quebec and then trans-shipped to Ontario.

Table 209.—Canada's Coal Supply and the Coal Equivalent of Other Mineral Fuels and Water Power Used

(Thousands of short tons)

	Anthr- cite Im- ported*	Bituminous		Lignite		Natural Gas (a)	Fuel and Gas Oils (b)	Gas- line Sales (c)	Kero- sene (d)	Water Power	
		Can- adian†	Im- ported*‡	Can- adian†	Im- ported*‡					Equiva- lent	Pounds of coal per kilowatt hour
1927.....	4, 108	12, 188	14, 059	3, 757	11	855	2, 314	2, 104	360	12, 908	1.84
1928.....	3, 749	12, 709	12, 756	3, 779	11	903	2, 667	2, 797	367	13, 821	1.76
1929.....	4, 020	12, 485	13, 690	3, 902	14	1, 135	3, 205	3, 475	328	14, 620	1.69
1930.....	4, 256	10, 649	14, 137	3, 404	19	1, 175	3, 189	3, 366	295	14, 219	1.62
1931.....	3, 162	8, 822	9, 660	2, 861	6	1, 035	2, 996	3, 219	291	12, 461	1.55
1932.....	3, 149	7, 806	8, 503	3, 407	3	937	2, 837	2, 896	341	11, 667	1.50
1933.....	3, 016	8, 128	7, 791	3, 328	3	926	3, 012	2, 803	265	12, 670	1.47
1934.....	3, 501	10, 051	9, 148	3, 185	3	926	3, 176	3, 091	267	15, 289	1.47
1935.....	3, 443	9, 783	8, 288	3, 523	5	996	3, 228	3, 316	194	16, 801	1.46
1936.....	3, 419	10, 683	9, 296	3, 826	5	1, 125	3, 259	3, 608	195	18, 210	1.46

*Entered for consumption.

†Sum of sales by Canadian coal mines, colliery consumption, coal supplied to employees and coal used in making coke, etc., less the tonnage exported.

‡Deductions have been made to take account of foreign coal re-exported from Canada and bituminous coal ex-warehoused for ships' stores.

(a) Based on 1 ton of coal=25 M cu. ft.

(b) Based on 1 ton of coal=151 imperial gallons.

(c) Based on 1 ton of coal=173 imperial gallons.

(d) Based on 1 ton of coal=160 imperial gallons.

Table 210.—World Production of Coal* 1932-1936

(Including brown coal)

(Long tons)

Country	1932	1933	1934	1935	1936
BRITISH EMPIRE					
Great Britain—					
Anthracite.....	6, 616, 972	7, 053, 043	7, 126, 733	6, 798, 415	6, 525, 225
Bituminous.....	202, 116, 168	200, 059, 200	213, 600, 955	215, 453, 637	221, 928, 387
Irish Free State—					
Anthracite.....	64, 506	86, 246	89, 731	85, 738	95, 214
Semi-bituminous.....	16, 674	19, 041	21, 343	26, 985	29, 509
Nigeria.....	252, 485	235, 133	259, 754	257, 819	291, 651
Southern Rhodesia.....	431, 183	476, 340	632, 790	693, 654	693, 947
Union of South Africa.....	9, 764, 425	10, 545, 197	12, 002, 100	13, 359, 509	14, 607, 313
Canada—					
Bituminous.....	6, 887, 749	7, 124, 360	8, 981, 055	8, 704, 322	9, 639, 406
Sub-bituminous.....	500, 805	494, 748	479, 918	505, 737	505, 567
Lignite.....	3, 092, 618	3, 008, 878	2, 869, 556	3, 189, 946	3, 452, 511
British Borneo—					
Brunet.....	†	†	†	838	184
State of North Borneo.....	168	78	28		
Federated Malay States.....	277, 848	218, 247	321, 461	377, 441	502, 823
India—					
Gondwana Coalfields.....	19, 814, 524	19, 456, 254	21, 691, 404	22, 607, 552	22, 212, 457
Tertiary Coalfields.....	338, 863	332, 909	366, 043	409, 143	398, 364
Used by mines.....	504, 000	495, 000	551, 000	575, 000	565, 000
Australia—					
Bituminous.....	8, 585, 858	9, 091, 976	9, 800, 672	10, 887, 954	11, 370, 409
Lignite.....	2, 612, 512	2, 580, 060	2, 617, 534	2, 221, 515	3, 044, 897
New Zealand—					
Bituminous.....	928, 234	843, 845	831, 702	825, 227	858, 857
Brown coal.....	806, 397	860, 238	1, 103, 968	1, 170, 805	1, 150, 071
Lignite.....	107, 391	117, 175	124, 645	119, 152	131, 289
Total British Empire.....	264, 000, 000	263, 000, 000	283, 000, 000	288, 000, 000	297, 000, 000
FOREIGN COUNTRIES					
Austria—					
Bituminous.....	217, 819	235, 150	246, 861	256, 484	240, 480
Brown coal.....	3, 055, 021	2, 966, 862	2, 805, 905	2, 923, 765	2, 851, 446
Belgium—					
Anthracite and semi-anthracite.....	4, 656, 753	5, 246, 607	5, 731, 792	5, 158, 236	5, 981, 898
Bituminous.....	16, 428, 442	19, 653, 598	20, 240, 618	20, 929, 493	21, 445, 070
Bulgaria—					
Anthracite.....	3, 075	3, 465	6, 812	2, 188	2, 286
Bituminous.....	93, 758	75, 184	70, 731	89, 318	98, 379
Lignite.....	1, 636, 501	1, 469, 896	1, 543, 192	1, 541, 239	1, 551, 206

* Data obtained from The Mineral Industry of the British Empire and Foreign Countries.

† Information not available.

(e) New South Wales only.

Table 210.—World Production of Coal 1932-1936—Continued

(Including brown coal)

(Long tons)

Country	1932	1933	1934	1935	1936
<i>FOREIGN COUNTRIES—Continued</i>					
Czechoslovakia—					
Bituminous.....	10,787,907	10,365,655	10,518,684	10,722,420	12,039,975
Brown coal.....	15,607,935	14,825,194	14,932,486	14,874,878	15,696,878
France—					
Saar.....	10,273,195	10,394,373	11,138,953 (f)	1,673,228	.....
Other districts—					
Anthracite and bituminous (a).....	45,535,513	46,146,465	46,879,876	45,482,687	44,512,354
Lignite.....	975,695	1,076,417	1,009,284	892,409	905,437
Germany—					
Bituminous.....	103,086,309	107,959,643	122,884,578	140,744,275	155,782,899
Brown coal.....	120,709,596	124,791,923	135,105,863	144,748,744	158,847,755
Greece—					
Lignite.....	135,410	97,496	102,547	91,163	103,953
Hungary—					
Bituminous.....	880,674	787,418	744,316	809,825	813,783
Brown coal.....	5,395,064	5,393,595	5,661,394	6,146,993	6,501,139
Lignite.....	442,726	420,348	420,101	464,588	491,652
Lignite (dehydrated).....	115,203	115,310	113,526	118,992	122,277
Italy—					
Anthracite.....	47,004	66,644	83,212	69,042	78,709
Bituminous.....	204,390	262,439	284,481	366,477	714,696
Brown coal.....	370,107	376,712	402,162	536,867	756,425
Jugoslavia—					
Bituminous.....	362,187	377,432	381,099	393,624	434,384
Lignite.....	1,010,853	905,274	921,391	936,659	952,916
Brown coal.....	3,030,987	2,806,202	2,944,406	3,034,480	3,017,941
Netherlands—					
Bituminous.....	12,554,978	12,375,372	12,145,975	11,690,250	12,600,340
Brown coal.....	122,115	95,511	91,032	84,843	87,377
Poland—					
Bituminous.....	28,379,163	26,924,235	28,771,390	28,091,945	29,278,040
Brown coal.....	32,900	32,963	25,986	18,170	13,305
Portugal—					
Anthracite.....	187,632	205,399	195,906	202,139	204,450
Bituminous.....	49,753	19,426	3,652	5,390	8,165
Brown coal.....	16,043	11,291	14,835	19,476	20,395
Roumania—					
Anthracite.....	12,052	17,777	17,726	16,935	3,649
Bituminous.....	172,992	173,986	207,004	256,962	284,299
Lignite.....	1,440,807	1,292,878	1,598,211	1,640,437	1,645,667
Russia—					
Anthracite.....	63,299,000	74,730,000	21,895,000	102,177,000	120,896,800
Bituminous.....			59,358,000		
Lignite.....			11,203,000		
Spain—					
Anthracite.....	539,110	563,399	634,440	690,000	†
Bituminous.....	6,206,607	5,340,855	5,203,891	6,214,994	†
Brown coal.....	330,981	296,260	293,926	299,028	†
Spitzbergen and Bear Island.....	261,500	419,367	524,393	697,607	771,471
Sweden.....	327,816	343,410	408,668	416,813	448,647
Switzerland (b).....	4,000	4,000	3,000	4,000	3,000
Algeria.....	24,584	29,948	33,465	37,316	6,400
Belgian Congo.....	17,000	413	4,622	11,136	13,682
Morocco (French)—					
Anthracite.....	14,724	27,275	35,501	51,864	49,621
Mozambique.....	19,430	15,600	21,524	15,250	8,161
Greenland.....	†	6,000	6,000	6,000	6,000
Mexico.....	642,314	636,622	769,803	1,124,847	1,276,000
United States—					
Anthracite.....	44,513,590	44,233,343	51,043,117	46,570,342	48,893,000
Bituminous and lignite.....	276,526,671	297,884,404	320,864,305	332,476,002	387,563,000
Brazil.....	499,170	624,442	697,071	744,998	651,738
Chile.....	1,063,027	1,513,770	1,778,979	1,869,929	1,841,000
Colombia (estimated).....	200,000	200,000	200,000	200,000	277,534
Peru—					
Anthracite.....	2,016	2,639	3,543	2,422	90,000
Bituminous.....	23,400	26,961	31,220	81,279	
Venezuela (c).....	4,644	4,862	6,000	5,000	7,000
China (d).....	18,370,000	18,505,000	20,568,000	12,000,000	†
Dutch East Indies.....	1,033,639	1,018,881	1,016,610	1,093,407	1,129,078
Formosa.....	1,335,595	1,333,701	1,496,051	1,572,000	1,600,000
French Indo-China—					
Anthracite.....	1,640,637	1,517,861	1,529,600	1,714,400	2,116,108
Bituminous.....	22,328	25,508	36,600	33,300	34,876
Brown coal.....	23,091	22,644			

† Information not available.

(a) Includes about 6,000,000 tons of anthracite each year.

(b) United States Bureau of Mines estimate.

(c) Excluding production in government owned mines.

(d) Of which about 3,000,000 tons are anthracite and 300,000 tons are lignite.

(f) January to February 17th, only, after which date production is included with that of Germany.

Table 210.—World Production of Coal 1932-1936—Concluded

(Including brown coal)

(Long tons)

Country	1932	1933	1934	1935	1936
FOREIGN COUNTRIES—Concluded					
Japan—					
Semi-anthracite and bituminous.....	27,610,311	32,010,079	35,357,604	37,166,085	37,466,000
Brown coal.....	106,818	113,958	122,815	106,812	↑
Karafuto.....	666,691	874,874	1,177,748	1,491,709	↑
Korea—					
Anthracite.....	1,086,755	729,511	966,855	1,062,283	1,035,240
Lignite.....		556,585	695,122	905,296	1,210,712
"Manchoukuo".....		7,992,000	11,640,768	↑	↑
Philippine Islands.....	18,184	15,668	↑	↑	↑
Turkey in Asia—					
Bituminous.....	1,568,411	1,822,856	2,252,129	2,303,526	2,262,345
Lignite.....	13,346	29,094	51,943	72,196	94,306
Total Foreign countries.....	850,000,000	890,000,000	980,000,000	1,010,000,000	1,120,000,000
Grand Total.....	1,110,000,000	1,150,000,000	1,260,000,000	1,300,000,000	1,420,000,000

↑ Information not available.

THE COKE AND ARTIFICIAL GAS INDUSTRY

Gas-house, by-product and bee-hive coke production in Canada during 1936 amounted to 2,404,793 tons worth \$16,710,008 compared with 2,257,604 tons at \$15,861,159 produced in 1935. The output of by-product and bee-hive coke in 1936 totalled 2,147,810 tons while production from gas retorts amounted to 256,893 tons. In addition, 64,706 tons of petroleum coke were recovered as a by-product in the petroleum refining industry.

Artificial gas production from by-product coke ovens reached a total of 37,003,403 thousand cubic feet and from other plants, 7,341,755 thousand cubic feet.

Sales of gas by producers totalled 15,321,832 thousand cubic feet worth \$15,163,664 of which 8,628,470 thousand cubic feet came from by-product ovens and 6,693,362 thousand cubic feet from gas works. Most of the remaining gas was used as a fuel in the producing plants or their associated metallurgical works. In addition to the above, 6,083,549 thousand cubic feet of still gas were produced by petroleum refineries, practically all of which was used for fuel purposes in the refineries.

Imports of gas-house and by-product coke rose to 612,858 tons from the 1935 total of 532,926 tons; exports, on the other hand, declined from 20,649 tons to 18,215 tons in 1936. Mixed gas imports into Canada during the year totalled 118,056 thousand cubic feet; the 1935 importations amounted to 106,401 thousand cubic feet.

Manufactured gas was sold to 476,677 consumers in 1936. The length of distributing mains was 3,785 miles. The calorific value of the gas sold ranged from 450 to 550 B.T.U. per cubic foot.

Table 211.—Materials used in the Coke and Gas Industry in Canada, 1934-1936

Materials	1934		1935		1936	
	Quantity	Value	Quantity	Value	Quantity	Value
Bituminous coal:—		\$		\$		\$
Canadian..... tons	844,303	3,459,633	989,154	4,129,750	1,057,099	4,278,820
Foreign*..... tons	2,271,801	10,270,998	2,147,189	9,641,302	2,301,399	10,704,663
Coke for gas-making:—						
Purchased..... tons	4,457	42,596	4,372	39,082	4,573	43,311
Companies' own make..... tons	77,255	530,351	72,833	510,895	92,665	664,429
Oil used for enriching water gas..... imp. gal.	6,140,084	355,953	4,532,573	325,365	3,907,255	277,467
Oil used for making oil gas..... imp. gal.	866,905	68,424	683,365	56,984	635,122	53,572
Absorbing and wash oil..... imp. gal.	182,417	25,080	191,004	20,338	261,734	30,686
Caustic soda..... lb.	678,006	19,515	711,051	18,948	683,065	17,270
Lime..... tons	1,911	11,686	2,375	13,712	2,361	16,900
Water.....		33,484		18,954		12,859
Oxide or purifying materials..... tons	3,787	47,010	3,701	46,204		41,291
Sulphuric acid 66° Bé..... lb.	33,907,546	238,148	40,775,289	280,079	39,939,799	312,270
All other materials.....		134,153		131,906		132,033
Total cost.....		15,237,031		15,233,519		16,585,571

*Includes 3,261 tons in 1935 and 3,159 tons in 1936 known to have been used in water gas sets.

Table 212.—Production in Canada, Imports and Exports of Coke and Its By-Products, 1934-1936

	1934		1935		1936	
	Quantity	Value	Quantity	Value	Quantity	Value
Coke						
		\$		\$		\$
PRODUCTION—by provinces—						
Nova Scotia, New Brunswick and Quebec.....	tons 654,305	4,369,150	730,469	4,738,191	775,275	4,655,468
Ontario.....	tons 1,388,709	10,200,363	1,334,081	9,868,953	1,441,833	10,807,611
Manitoba, Alberta and British Columbia.....	tons 200,406	1,292,244	193,054	1,254,015	187,690	1,246,929
Total.....	tons 2,243,420	15,861,757	2,257,604	15,861,159	2,404,793	16,710,008
IMPORTS.....	tons 934,833	.....	532,926	.....	612,858	.....
EXPORTS.....	tons 7,396	45,390	20,649	124,785	18,215	111,417
AVAILABLE FOR CONSUMPTION.....	tons 3,170,857	.....	2,769,881	.....	2,999,436	.....
Other Products						
PRODUCTION—						
Ammonium sulphate.....	tons 20,512	413,729	24,452	637,353	26,828	582,816
Gas: (a) Sales.....	M cu. ft. 15,409,927	15,766,750	15,398,952	15,358,572	15,321,832	15,163,664
(b) Used in own plants.....	M cu. ft. 13,636,957	1,753,926	13,329,088	1,660,389	16,665,381	2,165,284
(c) Used in associated metallurgical works.....	M cu. ft. 8,542,290	1,163,000	9,155,263	1,191,270	10,181,379	1,324,475
(d) Gas otherwise accounted for, but not sold.....	M cu. ft. 836,962	294,718	526,651	262,956	519,077	102,671
(e) Not accounted for.....	M cu. ft. 970,684	876,824	1,425,893	1,330,013	1,795,319	1,463,265
Benzol.....	imp. gal. 3,412,864	621,799	2,986,016	610,304	2,935,917	473,948
Toluol and xylol.....	imp. gal. 588,581	96,347	1,561,712	227,286	724,982	280,123
Other light oils.....	imp. gal. 25,840,781	1,397,413	25,686,490	1,312,455	2,862,815	242,036
Tar.....	imp. gal. 1,981,728	23,371	1,884,390	21,127	26,804,438	1,340,754
Ammonia liquor.....	pound N.H ₃ 2,386	.....	.....	1,905	1,779,748	17,797
All other products.....	.....	.....	.....	.....	.....	5,057
IMPORTS—						
Ammonium sulphate.....	tons 11,046	245,372	4,280	94,222	5,729	148,956
Coal tar and pitch.....	.....	80,063	.....	137,804	.....	162,060
EXPORTS—						
Ammonium sulphate.....	tons 57,704	1,144,164	45,055	977,552	83,835	1,802,818
Coal tar and pitch.....	gal. 6,745,866	390,751	4,242,867	202,282	3,032,501	155,870

THE NATURAL GAS INDUSTRY

Natural gas production in Canada during 1936 totalled 28,113,348 thousand cubic feet valued at \$10,762,243; in the preceding year, 24,910,786 thousand cubic feet worth \$9,363,141 were produced.

New Brunswick's output in 1936 totalled 606,246 thousand cubic feet and was obtained from wells in the Stony Creek field, near Moncton. The gas from this field was piped to Moncton and Hillsboro where approximately 5,500 consumers were served. There were 35 natural gas wells active in New Brunswick at the end of 1936.

Production in Ontario reached a total of 10,006,743 thousand cubic feet or 22.6 per cent above the 1935 output. Developments in this province during 1936 were outlined by Col. R. B. Harkness, Commissioner of Gas for Ontario, as follows:—

“Of the gas fields, all those with the exception of the Dover, Welland and Norfolk show increases; the greatest being in the Declute and Dawn fields. The Declute field has proven to be a major field and the latest developments at the time of writing (July, 1937) would indicate that a considerable portion of the field extends under Lake Erie. It is to be hoped that a considerable area under Lake Erie adjoining the Tilbury, Declute and Leamington gas fields will be found to be productive and a substantial reserve for the future.

“The new discovery, noted in last year's report, in Dereham township has been extended into Bayham township, and at the end of 1936 the number of producing wells has reached fourteen.

A plant was being built in January, 1937, to purify the gas and at the same time a pipe line was under construction to market the purified gas, through the facilities of the Southern Ontario Gas Company. A six inch transmission line was being laid from the centre of this field near Brownsville to the town of Ingersoll; in all, about 10 miles. This pipe line is owned by the Oxford Pipe Line Company.

"The extension of the Bayham township field known as the Eden field is gratifying although the limits appear to have been reached on three sides, east, north and west.

"In Haldimand county the number of producing wells drilled dropped from 134 to 90 but the average open flow of these new wells increased from 32 thousand cubic feet to 70 thousand cubic feet per well. The Haldimand field has been intensively drilled during the past five years: most of the promising areas have been completely drilled and the less promising areas are now being exploited, consequently the percentage of dry holes has increased from 31.6 per cent in 1935 to 36 per cent in 1936. The Dover field has been extended eastward into Raleigh township but there is still room for more development in Dover township. Dawn township has again received some attention and although the percentage of dry holes in this township is always high, producing wells are usually much better than average.

"Although a great deal of the above drilling may be called exploratory in the sense that the limits of the field are not known, it is not in the direction of discovering new fields. The only activity of this nature is in Chatham township where the Union Gas Company have been drilling for the past three years with indifferent results. They have, however, been sufficiently encouraged to continue drilling. The area to be explored is very large and will take some years to complete their program."

Ontario's drilling operations during 1936 resulted in the bringing in of 167 producing wells with a total footage of 159,184 feet and the drilling of 90 dry wells aggregating 105,722 feet. In 1935 there were 201 producing wells drilled to a total depth of 194,930 feet and 88 dry wells to an aggregate depth of 84,601 feet. On December 31, 1936, producing gas wells in Ontario numbered 3,055. Seventy-nine wells were abandoned during the twelve month period. A year ago, 2,998 wells were active and 48 wells were abandoned.

The natural gas industry in Ontario included the operations of 196 operating, distributing and drilling firms who reported a total capital employment of \$50,711,023. There were 1,516 salaried employees and wage-earners actively engaged during the year who received salaries and wages totalling \$1,653,239.

Developments in this industry in Saskatchewan consisted principally of the production of gas from the Lloydminster well. This well, which was drilled into commercial production in October, 1934, recorded an output of 90,839 thousand cubic feet in 1936.

An increase of 8.4 per cent was shown in Alberta's production during the year when 17,407,820 thousand cubic feet were produced compared with the 1935 total of 16,060,349 thousand cubic feet. These figures include only the natural gas consumed for industrial and domestic purposes and do not take account of the waste gas burned in the Turner Valley field and the gas piped to the Bow Island field for storage.

The Turner Valley field, located about 35 miles southwest of Calgary, is the largest natural gas producing area in Canada. The consumption of Turner Valley gas for industrial (including drilling) and domestic use in 1936 totalled 10,593,321 thousand cubic feet against 9,718,000 thousand cubic feet in the preceding year and 9,571,600 thousand cubic feet in 1934. Approximately 23,500 consumers in Calgary, Lethbridge and the district were served with this gas during 1936; in addition, a considerable quantity was used for drilling purposes in the field. Following the practice of preceding years, a large quantity of Turner Valley gas was piped to the Bow Island field for repressuring wells in that area. About 10,700,000 thousand cubic feet of this gas have been piped into these wells since 1930 and their pressure has increased from 248 pounds to about 527 pounds.

Natural gas consumption in the city of Medicine Hat amounted to 2,460,523 thousand cubic feet against 2,225,251 thousand cubic feet a year ago. The Medicine Hat field supplied gas to 2,500 consumers in 1936. The Redcliff field, about two miles west of Medicine Hat, served approximately 260 industrial and domestic consumers who used 696,719 thousand cubic feet of gas.

The Viking field, located about 80 miles southeast of Edmonton, supplies that city with natural gas. In 1936 this field provided gas for 10,400 consumers in Edmonton and 479 users outside the city. Twenty-two wells were in operation in the Viking field during 1936.

The Maple Leaf well in the Fabyan field furnished gas to approximately 300 consumers in Wainwright during 1936.

On December 31, 1936, there were 95 wells in Alberta producing natural gas only; at the close of the preceding year, 96 wells were active. Companies operating in this industry in Alberta during the year reported capital employed at \$25,063,756, average number of employees at 463, and salaries and wages at \$682,972. The cost of fuel and electricity used in 1936 was \$1,855.

At Fort Norman, in the Northwest Territories, 1,100 thousand cubic feet of natural gas were used for power purposes during 1936.

Mixed gas (natural and artificial) imported into Canada by pipe line from the United States amounted to 118,056 thousand cubic feet valued at \$75,985; a year ago, 106,401 thousand cubic feet at \$70,154 were imported.

The 227 operators actively engaged in the Canadian natural gas industry in 1936 had a total capital investment of \$77,666,568. On the average, 2,075 salaried employees and wage-earners were employed in this industry during the year; these employees received salaries and wages totalling \$2,456,918. Fuel and electricity costs in 1936 amounted to \$77,658.

Table 213.—Production of Natural Gas in Canada, by Provinces, 1927-1936

(For the years 1892 to 1926 see Mineral Production of Canada, 1928)

Year	New Brunswick		Ontario		Manitoba		Alberta		Canada	
	M cu. ft.	Value	M cu. ft.	Value	M cu. ft.	Value	M cu. ft.	Value	M cu. ft.	Value
		\$		\$		\$		\$		\$
1927.....	630,755	124,637	7,311,215	4,231,780	200	60	13,434,621	3,586,533	21,376,791	8,043,010
1928.....	660,981	324,344	7,632,800	4,535,312	200	60	14,288,605	3,754,466	22,582,586	8,614,182
1929.....	678,456	333,002	8,586,475	4,959,695	600	180	19,112,931	4,684,247	28,378,462	9,977,124
1930.....	661,975	325,751	7,965,761	5,034,823	600	180	20,748,583	4,920,226	29,376,919	10,289,985
1931.....	655,891	323,184	7,419,534	4,635,497	600	180	17,798,698	4,067,893	25,874,723	9,026,754
1932.....	662,452	326,191	7,386,154	4,719,297	600	180	15,370,968	3,853,794	23,420,174	8,899,462
1933.....	618,033	302,706	7,166,659	4,523,085	600	180	15,352,811	3,886,263	23,138,103	8,712,234
1934.....	623,601	306,005	7,682,851	4,741,368	600	180	14,841,491	3,707,276	(a)23,162,324	(a)8,759,652
1935.....	615,454	303,886	8,158,825	4,938,084	600	180	16,060,349	4,113,436	(b)24,910,786	(b)9,363,141
1936.....	606,246	298,819	10,006,743	6,052,294	600	180	17,407,820	4,376,720	(c)23,113,348	(c)10,762,243

(a) Includes production in Saskatchewan of 13,781 M cu. ft. at \$4,823.

(b) Includes production in Saskatchewan, of 75,558 M cu. ft. at \$7,555.

(c) Includes production in Saskatchewan at 90,839 M cu. ft. at \$33,985 and in the Northwest Territories of 1,100 M cu. ft. at \$245.

Table 214.—Production of Natural Gas in Canada, by Months, 1936

	New Brunswick	Ontario	(a) Manitoba	Saskatchewan	Alberta	CANADA
	M cu. ft.	M cu. ft.	M cu. ft.	M cu. ft.	M cu. ft.	M cu. ft.
January.....	74,315	981,593	50	14,179	2,424,473	3,494,610
February.....	78,887	1,177,075	50	15,485	2,886,892	4,158,339
March.....	67,728	901,696	50	9,954	1,963,660	2,943,088
April.....	57,736	858,473	50	8,442	1,575,358	2,500,059
May.....	50,452	705,401	50	3,494	1,063,217	1,822,614
June.....	38,211	641,586	50	2,359	650,389	1,322,595
July.....	28,148	555,451	50	1,939	630,007 (b)	1,216,095
August.....	24,361	508,608	50	1,793	648,915 (b)	1,184,327
September.....	28,879	595,104	50	4,058	892,657	1,520,748
October.....	40,874	858,848	50	7,374	1,128,268	2,035,414
November.....	53,876	1,061,880	50	7,993	1,489,961	2,613,760
December.....	62,779	1,161,028	50	13,769	2,054,023	3,291,649
Total.....	606,246	10,006,743	600	90,839	17,407,820	28,113,348

(a) Estimated.

(b) Includes production from Fort Norman, Northwest Territories.

Table 215.—Natural Gas Production in Ontario, by Fields, 1935 and 1936 (a)

County	Field	1935	1936
		M cu. ft.	M cu. ft.
Essex.....	Kingsville.....	4,161,021	3,531,870
	{ Tilbury.....		
Kent.....	{ Declute.....		1,298,362
	{ Dover.....	935,446	(Declute) 842,362
Lambton.....	Dawn and Oil Springs.....	411,944	1,436,919
Elgin.....	Bayham.....	116,118	207,914
Norfolk.....	Norfolk.....	472,993	642,653
Lincoln.....	Lincoln.....		
Haldimand.....	Haldimand.....	1,576,323	1,735,171
Wentworth.....	Wentworth.....		
Brant.....	Onondaga.....	120,461	130,747
Bruce.....	Amabel.....	400	400
Welland.....	Welland.....	290,119	286,345
Wells in surface drift.....	Howard and Sarnia.....	14,000	14,000
Private wells.....		60,000	60,000
Total produced.....		8,158,825	10,006,743
Value.....		\$ 4,938,084	\$ 6,054,294
Imported mixed gas.....		98,848	113,721
Total distributed.....		8,257,673	10,120,464

(a) Prepared by the Ontario Department of Mines.

Table 216.—Number of Gas Wells in Canada, by Provinces, 1934-1936

	New Brunswick	Ontario	Manitoba	Saskatchewan	Alberta	Canada
Productive wells at beginning of year... 1934	31	2,708	6		87	2,832
1935	30	2,869	6	1	92	2,998
1936	35	2,998	6	1	94	3,134
Number of productive wells drilled..... 1934	1	217		1	1	220
1935	1	201		2		204
1936	1	165			1	167
Number of dry wells drilled..... 1934		77	1			(a) 81
1935		88		2		90
1936		89				89
Number of wells abandoned..... 1934	2	60				62
1935		48			2	50
1936	1	80				81
Productive wells at end of year..... 1934	30	2,869	6	1	92	2,998
1935	35	2,998	6	1	94	3,134
1936	35	3,055	5	1	95	3,191

(a) Includes one dry well drilled in Quebec.

Table 217.—Natural Gas Wells in Ontario, by Townships, 1935 and 1936

Township	1935				1936			
	No. of producing wells in operation Dec. 31, 1934	No. of wells abandoned this year	No. of dry wells drilled this year	No. of producing wells drilled this year	No. of producing wells in operation Dec. 31, 1935	No. of wells abandoned this year	No. of dry wells drilled this year	No. of producing wells drilled this year
Amabel.....	2		5	3	2		2	2
Ancaster.....								
Bayham.....	45	1		9	49	5	4	10
Bertie.....	95	1	1	1	96		1	2
Beverley.....			1					
Binbrook.....	53			1	52	1		
Caistor.....	64	1		4	62	2		
Canboro.....	185			13	175	13		3
Caledon, East.....	5							
Cayuga, North.....	191	2	7	21	200	1	13	13
Cayuga, South.....	55		1	1	60		3	5
Charlotteville.....	13				15		1	2
Chatham.....			1				4	1
Chinguacousy.....								
Crowland.....	26	3			26			
Dawn.....	22				23		5	6
Dereham.....				2			4	11
Dorchester, North.....			1			3		
Dover, East.....								
Dover, West.....	22		2	10	22		1	1
Dunn.....	49	2		1	51	2		2
Enniskillen.....	4				4			
Euphemia.....								
Gainsboro.....	13	2		1	13	5	1	3
Glanford.....	11			2	12	1		
Gosfield.....	23			3	21	1		2
Houghton.....	4	1			4		1	
Humberstone.....	57	3			57			
Keppel.....				1			1	
Malahide.....	1				1		1	
Mersea.....	3				3			
Middleton.....	47		1	2	49			7
Moulton.....	112	9	8	7	107	6	3	11
Oneida.....	69	2	12	15	71	2	1	3
Onondaga.....	44	1	4	5	41	7	1	7
Rainham.....	282	5	12	16	291	5	7	8
Raleigh.....	37	1	3	2	32	5	3	2
Romney.....	139	1			136	2	1	
Sarnia.....	13				13			
Seneca.....	183	3	8	13	177	6		
Sherbrooke.....	12	1			12			
Sombra.....							1	
Tilbury, East.....	145		1	1	144	1		1
Townsend.....	2				2			
Tuscarora.....	76	4		6	84	3		9
Wainfleet.....	25	1	1	2	27	4	3	3
Walpole.....	361	2	14	51	412	3	22	45
Walsingham, N.....	13	1			13			
Walsingham, S.....	13	1	1	2	13			
Windham.....	10				10		1	
Willoughby.....	41		2	1	41			
Woodhouse.....	62	2		5	63	2	2	6
Private wells.....	300				300			
Surface wells.....	69				69			
Total.....	2,998	48	88	201	3,055	80	89	165

Table 218.—Capital Employed in the Natural Gas Industry in Canada, by Provinces, 1935 and 1936

	1935			1936		
	Ontario	Alberta	Canada	Ontario	Alberta	Canada
	\$	\$	\$	\$	\$	\$
CAPITAL EMPLOYED AS REPRESENTED BY—						
Cost of lands, buildings, plant, machinery and tools.....	35,197,406	22,706,343	59,679,653	39,513,519	23,141,229	64,326,924
Cost of supplies and stock on hand.....	387,334	166,027	567,134	2,631,419	162,233	2,863,194
Cash, trading and operating accounts and bills receivable.....	7,313,817	1,548,929	8,974,264	8,566,085	1,760,294	10,476,450
Total.....	42,898,557	24,421,299	*69,221,051	50,711,023	25,063,756	†77,666,568

*Includes data for New Brunswick and Saskatchewan.

†Includes data for New Brunswick, Manitoba and Saskatchewan.

Table 219.—Employees, Salaries and Wages in the Natural Gas Industry in Canada, by Provinces, 1935 and 1936

Province	*Average number of employees				Salaries and wages		
	Salaried employees		Wage- earners	Total	Salaries	Wages	Total
	Male	Female					
1935					\$	\$	\$
New Brunswick.....	14	6	56	76	36,390	63,486	99,876
Ontario.....	422	97	710	1,229	652,524	560,904	1,213,428
Saskatchewan.....	1	.....	16	17	300	20,931	21,231
Alberta.....	87	31	279	397	173,553	424,849	598,402
Canada.....	524	134	1,061	1,719	862,767	1,070,170	1,932,937
1936							
New Brunswick.....	14	6	66	86	39,524	75,515	115,039
Ontario.....	513	131	872	1,516	902,619	750,620	1,653,239
Manitoba.....	1	1	1	3	591	629	1,220
Saskatchewan.....	2	.....	5	7	3,000	1,448	4,448
Alberta.....	93	36	334	463	191,772	491,200	682,972
Canada.....	623	174	1,278	2,075	1,137,506	1,319,412	2,456,918

*See footnote on page 28.

Table 220.—Casing Used in the Natural Gas Industry in Canada, 1936

Size	Weight	Length	Size	Weight	Length
Inches	Pounds	Feet	Inches	Pounds	Feet
2.....	19,462	4,325	8.....	25,944	1,078
4½.....	16,185	1,500	8½.....	21,478	1,017
5.....	25,942	3,093	10.....	189,556	4,753
5½.....	139,305	8,019	12.....	3,500	70
6.....	114,788	9,692	12½.....	18,450	369
6½.....	19,247	1,569	13.....	6,257	120
6¾.....	254,782	15,306	15½.....	5,600	80
6¾.....	179,498	7,866	Total.....	1,039,994	58,857

THE PEAT INDUSTRY

Peat production in Canada during 1936 amounted to 1,341 tons worth \$7,376; in the preceding year 1,340 tons at \$5,761 were produced. The 1937 output was obtained from bogs in Quebec and Ontario.

Table 221.—Production of Peat in Canada, 1927-1936

Year	Tons	Value
		\$
1927.....	.....	.....
1928.....	1,497	5,845
1929.....	2,607	13,339
1930.....	2,847	10,932
1931.....	1,674	7,033
1932.....	3,248	7,593
1933.....	1,131	3,449
1934.....	1,878	7,343
1935.....	1,340	5,761
1936.....	1,341	7,376

THE PETROLEUM INDUSTRY IN CANADA

Including (1) Production of Crude Petroleum; and (2) Petroleum Products.

1. Production of Crude Petroleum

The Canadian production of crude petroleum in 1936 amounted to 1,500,374 barrels; in 1935 the output totalled 1,446,620 barrels. The 1936 output included 17,112 barrels from New Brunswick, 165,495 barrels from Ontario, 1,312,368 barrels from Alberta, and 5,399 barrels from the Northwest Territories.

Alberta's production in 1936 was 3.9 per cent higher than the total for the preceding year. The Turner Valley field produced 1,281,248 barrels of natural gasoline, crude naphtha, and light crude oil during the year under review, the Red Coulee and Del Bonita fields, 16,185 barrels, and the Wainwright field, 14,935 barrels. One hundred and twenty-nine wells were in operation in Alberta at the close of 1936 and drilling was in progress on 31 other wells in the Turner Valley, Hunter Valley, High River, and other fields. Ten new wells were brought into production during the year compared with five in 1935. Approximately 94,000 feet of drilling were done in 1936; in the previous year, 59,900 feet were drilled. Alberta operators reported the use of 137,895 feet of casing, weighing 2,364 tons; a year ago, 69,510 feet weighing 1,383 tons were used. The casing used in 1936 was valued at \$264,581 against the preceding year's valuation of \$118,444.

Four natural gasoline absorption plants were in operation in Alberta during 1936. Two of these plants are owned by the Royalite Oil Company Limited. The Gas and Oil Products Limited operate a plant in the South Turner Valley field. A new plant was completed by the British American Oil Company in 1936 and was operated from July onwards. The total output of natural gasoline from these four plants in 1936 was 597,261 barrels.

The year under review was one of outstanding importance to Alberta's oil industry. The bringing in of the Turner Valley Royalties well on the west flank of the southern end of the Turner Valley field resulted in increased drilling activity in the search for crude oil in this area. This well reached the top of the producing Palaeozoic limestone at a depth of 6,396 feet and was completed in June at a total depth of 6,828 feet. Production from the Turner Valley Royalties well ranged initially from 850 to 875 barrels of 44° A.P.I. gravity oil and 2,000 thousand cubic feet of gas per day. Later a decline to 750 barrels a day took place and this rate of output has been steadily maintained.

According to Spratt & Taylor, the most notable of the west flank producers is Model No. 1, located in the north end of the field and 12 miles distant from the Turner Valley Royalties well. The Model oil was originally 68° A.P.I. gravity compared with 46° A.P.I. gravity at present. Over a period of seven years this well has produced approximately 386,000 barrels and it continues to produce about 155 barrels a day from 500 thousand cubic feet of gas, initially a similar oil output was obtained from some 4,000 thousand cubic feet.

The Northwest Company Limited drilled two wells on the Jumping Pound structure, west of Calgary, in an attempt to find crude oil in the upper Lower Cretaceous strata. They were unsuccessful in these attempts and these wells were abandoned at a depth of 1,652 feet and 2,019 feet respectively. In the Red Deer Foothills area, 60 miles north and 60 miles west of Calgary, drilling progressed during the year on the Hunter Valley well to a depth of 6,965 feet. Shows of oil and gas were reported but none of these was tested. The Arca well, in the Plains area, was commenced in the Alberta syncline east of the foothills. On December 31 this well had been drilled to a depth of 8,774 feet, reaching the top of the Palaeozoic at 8,750 feet but it has not yet been completed.

Ontario's output during the past six years has shown a steady increase. During 1936, production amounted to 165,495 barrels, averaging \$2.12 per barrel; in the previous year, 165,041 barrels were produced with an average value of \$2.10 and in 1934 the output was 141,385 barrels at \$2.12 a barrel.

Activities in Ontario's petroleum industry during 1936 were summarized by Col. R. B. Harkness, Commissioner of Gas for Ontario, as follows: "It is most gratifying to see the increased production in 1936 from the Enniskillen, Oil Springs, Moore and Bothwell fields compared with 1930. The first three fields are over seventy years old. The new production in Bothwell is actually coming from wells drilled in the 1860's which have been idle for many years. These

wells have been cleaned out and re-equipped and are now pumping continuously. The Dover field was producing oil from two gas wells; the oil was incidental to the gas. In the extension of the field in the past two years, three oil wells have been added having an initial production of from 25 to 35 barrels per day. The Dawn field is a new field; the oil comes from three wells in the gas field. The Mosa field showed a greater increase in the year 1934 and has been decreasing for the past two years.

"The success attained in the Bothwell field has fired the oil men with new vigour and two fields, the Fletcher and the Onondaga oil fields, are to receive attention in 1937. New wells are being drilled in the Fletcher field which has produced over 1,000,000 barrels to date, and cleaning out and re-drilling in the Onondaga field from which has been produced approximately 40,000 barrels of oil from a very much smaller area than the Fletcher oil field."

Drilling operations in the Ontario petroleum fields were carried on by nine drillers with a capital investment of \$14,850. Nine men were employed during the year and disbursements totalled \$3,262. In all, 23,874 feet were drilled in 1936.

Petroleum production in New Brunswick advanced to 17,112 barrels from the 1935 total of 12,954 barrels. As usual, the 1936 output was obtained from the Stony Creek field near Moncton. This crude oil was treated in a small topping plant at Weldon and gasoline and fuel oil were recovered.

Discovery No. 1 and No. 2 Wells near Fort Norman, Northwest Territories, were operated during the period June to September, 1936, and produced 5,399 barrels of oil; a year ago 5,115 barrels were produced. This oil, which ranged from 38° to 41° Bé, was treated at a small refinery near Fort Norman and a considerable part of the gasoline and fuel oil was used in connection with mining operations in the Great Bear Lake area.

Capital employed by companies operating and drilling oil wells in Canada during 1936 amounted to \$33,289,876. Employment was furnished by this industry to 1,052 salaried employees and wage-earners who received a total remuneration of \$1,298,592. The cost of fuel and electricity used during the year was \$235,210.

Exports of petroleum and its products from Canada in 1936 were valued at \$1,691,156 or 57.5 per cent above the 1935 total of \$1,074,072. Approximately 38.7 per cent of the 1936 exports consisted of fuel oil and 30.1 per cent of gasoline and naphtha.

In 1936, Canada imported petroleum, asphalt and their products to a value of \$50,394,304; during the preceding year the value of imports was \$44,627,414 and the 1934 total was \$41,762,626.

Crude petroleum imported in its natural state during 1936 totalled 1,256,665,331 gallons; the United States supplied 74.5 per cent of this quantity; Colombia, 10.6 per cent; Peru, 9.9 per cent; Venezuela, 4.8 per cent, and Trinidad, 0.2 per cent.

Receipts of gasoline, including casinghead, during 1936 declined to 58,476,986 gallons from the 1935 total of 68,032,212 gallons. The 1936 gasoline importations were obtained principally from the following sources—the United States, 38,601,891 gallons; Peru, 18,009,035 gallons and Roumania, 1,845,000 gallons. Imports of fuel oil declined to 45,092,500 gallons in 1936 from the preceding year's total of 49,277,712 gallons.

Table 222.—Production of Crude Petroleum in Canada, by Provinces, 1927-1936

(For the years 1881 to 1926 see Mineral Production of Canada, 1928.)

(Barrel=35 Imp. gal.)

Year	New Brunswick		Ontario		Alberta		Northwest Territories		Canada	
	Barrels	Value \$	Barrels	Value \$	Barrels	Value \$	Barrels	Value \$	Barrels	Value \$
1927.....	18,244	41,748	139,606	288,347	318,741	1,185,948	.....	.....	476,591	1,516,043
1928.....	8,043	21,391	134,094	249,737	482,047	1,764,172	.....	.....	624,184	2,035,300
1929.....	7,499	19,909	121,194	253,678	988,675	3,458,177	.....	.....	1,117,368	3,731,764
1930.....	6,758	17,378	117,302	235,746	1,398,160	4,780,696	.....	.....	1,522,220	5,033,820
1931.....	6,577	15,461	122,365	219,993	1,413,631	3,976,220	.....	.....	1,542,573	4,211,674
1932.....	6,408	14,332	130,343	247,468	906,751	2,751,541	910	9,251	1,044,412	3,022,592
1933.....	8,835	18,111	136,058	253,486	995,832	2,844,157	4,608	23,037	1,145,333	3,138,791
1934.....	11,106	22,277	141,385	299,874	1,253,966	3,104,823	4,438	22,188	1,410,895	3,449,162
1935.....	12,954	18,230	165,041	346,156	1,263,510	3,102,227	5,115	25,575	1,446,620	3,492,188
1936.....	17,112	24,075	165,495	350,767	1,312,368	3,019,930	5,399	26,995	1,500,374	3,421,767

Table 223.—Production of Crude Petroleum in Canada, by Months, 1936

(Barrel=35 imperial gallons)

Months	*New Brunswick	Ontario	*Alberta	*Northwest Territories	Canada
January.....	43	15,047	105,171		120,261
February.....	51	10,845	96,077		106,973
March.....	47	14,707	101,857		116,611
April.....	2,162	12,712	94,230		109,104
May.....	1,810	13,698	98,739		114,297
June.....	1,027	14,484	97,639	91	114,141
July.....	2,095	15,074	122,771	2,464	142,404
August.....	1,968	13,534	124,287	2,783	142,572
September.....	1,917	13,496	120,210	61	135,684
October.....	1,864	14,502	120,638		137,004
November.....	1,742	13,616	113,794		129,152
December.....	969	13,780	124,979		139,728
Total.....	16,595	165,495	1,320,442	5,399	1,507,931

*These figures represent the total output each month.

Table 224.—Production of Crude Petroleum in Canada, 1935 and 1936

Provinces	1935		1936	
	Barrels	Total Value	Barrels	Total Value
		\$		\$
NEW BRUNSWICK.....	12,954	18,230	17,112	24,075
ONTARIO—				
Petrolia and Enniskillen.....	59,282	123,243	59,092	124,088
Oil Springs.....	31,646	68,926	31,795	69,947
Moore Township.....	3,264	6,783	3,200	6,720
Sarnia Township.....	871	1,810	554	1,226
Plympton Township.....	237	493	248	521
Bothwell Township.....	34,714	72,136	36,534	76,719
West Dover.....	13,117	27,257	15,536	32,625
Onondaga.....	431	874	262	609
Mosa Township.....	8,788	18,262	8,182	17,182
Brooke.....	122	254		
Dunwich.....	408	848	307	645
Raleigh and Tilbury East.....	195	405	1,126	2,364
Thamesville.....	428	889	458	962
Dawn and Euphemia.....	11,538	23,976	8,171	17,159
Total for Ontario.....	165,041	346,156	165,495	350,767
ALBERTA—				
Turner Valley.....	1,234,872	3,071,951	1,281,248	2,989,447
Red Coulee-Border-Keho (light crude).....	14,772	18,847	16,185	19,143
Wainwright-Skiff (heavy crude).....	13,866	11,429	14,935	11,340
Total for Alberta.....	1,263,510	3,102,227	1,312,368	3,019,930
NORTHWEST TERRITORIES.....	5,115	25,575	5,399	26,995
Canada.....	1,446,620	3,492,188	1,500,374	3,421,767

Table 225.—Petroleum Wells in Canada, by Provinces, 1934-1936

	New Brunswick	Ontario	Alberta	Canada
Productive wells at beginning of year.....	1934 23	2,151	113	2,287
	1935 23	2,066	122 (a)	2,213
	1936 23	2,109	122 (a)	2,256
Number of productive wells drilled.....	1934 11	8	8	19
	1935 12	5	5	17
	1936 21	10	10	31
Number of wells abandoned.....	1934 102	9	9	111
	1935 32	1	1	33
	1936 253	1	1	254
Number of dry wells drilled.....	1934 12	3	3	15
	1935 47	2	2	49
	1936 20	3	3	23
Number of productive wells in operation at end of year.....	1934 23	2,066	122 (a)	2,213
	1935 23	2,109	122 (a)	2,256
	1936 23	2,079	129 (a)	2,233

(a) Includes 2 wells in the Northwest Territories.

Table 226.—Imports into Canada of Petroleum, Asphalt and Their Products, 1935 and 1936

	1935		1936	
	Quantity	Value	Quantity	Value
		\$		\$
Oil, imported by miners or mining companies or concerns, for use in the concentration of ores of metals in their own concentrating establishments..... imp. gal.	68,155	49,354	105,052	83,470
Crude petroleum, gas oils, other than naphtha, benzine and gasoline, lighter than .8235 but not less than .775 specific gravity at 60° temperature (To April 30, 1936)..... imp. gal.	29,797	1,728	10,366	682
Crude petroleum in its natural state, .7900 specific gravity or heavier at 60° temperature, when imported by oil refiners to be refined in their own factories (To April 30, 1936)..... imp. gal.	1,156,788,480	33,816,433	220,312,360	6,881,369
Crude petroleum not subjected to any other process than natural weathering and removal of foreign matter and water when imported by oil refiners to be refined in their own factories, .8155 specific gravity (42.0° A.P.I.) or heavier at 60° Fahrenheit (From May 1, 1936)..... imp. gal.			1,024,350,283	32,301,227
Crude petroleum not subjected to any other process than natural weathering and removal of foreign matter and water, when imported by oil refiners to be refined in their own factories, lighter than .8155 specific gravity (42.0° A.P.I.) at 60° Fahrenheit (From May 1, 1936)..... imp. gal.			9,341,344	418,526
Petroleum tops; blends of petroleum tops or petroleum products with crude petroleum; all the foregoing .7249 specific gravity (63.7° A.P.I.) or heavier at 60° Fahrenheit when imported by oil refiners to be refined..... imp. gal.	1,098,559	66,558	69,202	3,864
Petroleum (not including crude petroleum imported to be refined or illuminating or lubricating oils) .8235 specific gravity or heavier at 60° temperature (fuel oil) (To April 30, 1936)..... imp. gal.	30,887,850	1,108,762	4,954,374	187,056
Crude petroleum, n.o.p. (From May 1, 1936)..... imp. gal.			2,661,344	78,294
Fuel oil, ex-warehoused for ships' stores..... imp. gal.	18,389,862	507,283	24,048,703	692,951
Illuminating oils composed wholly or in part of the products of petroleum, coal, shale or lignite, costing more than thirty cents per gallon (To April 30, 1936)..... imp. gal.	3,337	1,120	970	372
Coal oil and kerosene lighter than .8236 specific gravity at 60° temperature..... imp. gal.	1,269,150	111,667	1,360,721	116,057
Engine distillate .8017 specific gravity or heavier at 60° temperature..... imp. gal.	83,962	8,731	1,220,037	93,158
Gasoline lighter than .8236 specific gravity at 60° temperature imp. gal.	19,614,867	1,661,306	19,077,873	1,643,152
Natural casinghead, compression or absorption gasoline, lighter than .6690 specific gravity (80.0 A.P.I.) at 60° Fahrenheit, when imported by refiners of crude petroleum for blending with gasoline wholly produced in Canada..... imp. gal.	48,417,345	2,889,814	39,399,113	2,452,358
Lubricating oils, composed wholly or in part of petroleum, and costing less than 25 cents per gallon..... imp. gal.	10,232,069	1,457,333	11,049,911	1,738,131
Lubricating oils, n.o.p..... imp. gal.	3,019,201	1,188,992	3,247,038	1,208,579
All other oils, n.o.p..... imp. gal.	3,103,221	233,680	338,791	84,265
Products of petroleum, n.o.p., .8236 specific gravity (40.3° A.P.I.) or heavier at 60° Fahrenheit (From May 1, 1936)..... imp. gal.			16,089,423	602,123
Grease, axle..... lb.	3,973,299	203,310	4,950,846	262,226
Vaseline and all similar preparations of petroleum, for toilet, medicinal or other purposes..... \$		252,740		303,149
Paraffine wax..... lb.	5,234,224	196,118	4,291,834	184,450
Paraffine wax candles..... lb.	164,500	30,737	195,458	33,873
Naphtha and products of petroleum, n.o.p., lighter than .8235 specific gravity at 60° temperature (To April 30, 1936)..... imp. gal.	1,922,743	165,278	603,004	56,088
Products of petroleum, n.o.p., lighter than .8236 specific gravity at 60° temperature (From May 1, 1936)..... imp. gal.			1,532,122	143,520
Liquefied petroleum gases for heating, cooking or illuminating purposes when imported in containers (From May 1, 1936)..... \$				4,953
Asphaltum or asphalt, solid..... cwt.	120,024	126,979	125,048	145,527
Asphalt, not solid..... imp. gal.	113,104	12,265	37,810	4,518
Asphaltum oil for paving purposes only..... imp. gal.	29,035	2,338	42,497	3,250
Coke, petroleum..... tons	81,761	534,888	88,241	667,116
Total, Petroleum, Asphalt and Their Products..... \$		44,627,414		50,394,304

Table 227.—Exports of Petroleum and Its Products, 1935 and 1936

	1935		1936	
	Quantity	Value	Quantity	Value
		\$		\$
Oil, petroleum, crude.....	imp. gal. 897	132	216	9
Oil, coal and kerosene, refined.....	imp. gal. 806,760	99,783	631,681	93,267
Oil, gasoline and naphtha.....	imp. gal. 3,357,902	413,469	3,378,983	509,150
Fuel oil and other mineral oils, n.o.p. (To March 31, 1935).....	imp. gal. 686,393	34,364		
Fuel oil (From April 1, 1935).....	imp. gal. 8,349,733	240,577	19,412,825	654,928
Oil, mineral, n.o.p. (From April 1, 1935).....	imp. gal. 465,697	110,177	614,332	181,777
Wax, mineral.....	cwt. 5,829	26,022	375	1,830
Coke, petroleum.....	tons 16,941	304,134	14,548	250,195
Total—Petroleum and Its Products.....	\$	1,238,658		1,691,156
RE-EXPORTS				
Kerosene.....	imp. gal. 42	14		
Gasoline.....	imp. gal. 10,826	1,646	20,797	2,781
Fuel oil.....	imp. gal. 9,316	792		
Oil, mineral, n.o.p.....	imp. gal. 1,980	1,572	4,146	2,048
Wax, mineral.....	cwt. 4	193	585	1,306
Petroleum coke (From April 1, 1935).....	tons 7,651	144,754	21,115	328,386
Total—Re-Exports.....	\$	148,971		334,521

Table 228.—Capital Employed in the Petroleum Industry in Canada, by Provinces,* 1935 and 1936

	1935			1936		
	Ontario	Alberta	Canada†	Ontario	Alberta	Canada†
	\$	\$	\$	\$	\$	\$
CAPITAL EMPLOYED AS REPRESENTED BY—						
Cost of lands, buildings, plant, machinery and tools.....	1,022,116	24,654,058	25,698,966	916,783	25,274,499	26,231,490
Cost of supplies and stocks on hand.....	7,180	1,002,480	1,027,976	15,349	681,749	712,070
Cash, trading and operating accounts and bills receivable.....	11,140	6,657,484	6,671,952	16,228	6,274,354	6,346,316
Total.....	1,040,436	32,314,022	33,398,894	948,360	32,230,602	33,289,876

* Data for New Brunswick included in the "Natural Gas Industry".

† Includes data for the Northwest Territories.

Table 229.—Employees, Salaries and Wages in the Petroleum Industry in Canada, by Provinces,† 1935 and 1936

Province	* Average number of employees				Salaries and wages		
	Salaried employees		Wage-earners	Total	Salaries	Wages	Total
	Male	Female					
1935					\$	\$	\$
Ontario.....	12	1	208	221	13,755	114,107	127,862
Alberta†.....	113	26	580	719	249,982	668,202	918,184
Canada.....	125	27	788	940	263,737	782,309	1,046,046
1936							
Ontario.....	13	2	199	214	15,990	108,103	124,093
Alberta†.....	119	31	688	838	247,323	927,176	1,174,499
Canada.....	132	33	887	1,052	263,313	1,035,279	1,298,592

* See footnote on page 28.

† Data for New Brunswick included in the "Natural Gas Industry".

† Data for the Northwest Territories included with Alberta.

Table 230.—Casing Used in the Petroleum Industry in Canada, 1935 and 1936

Size	1935		1936		Size	1935		1936	
	Weight	Length	Weight	Length		Weight	Length	Weight	Length
Inches	Pounds	Feet	Pounds	Feet	Inches	Pounds	Feet	Pounds	Feet
3.....			11,681	1,536	12½.....	52,609	974	33,507	620
4.....			29,685	4,336	13.....	67,797	1,211		
4½.....			4,240	265	13½.....	320,388	5,508	473,094	8,761
6.....	55,744	2,534	351,016	13,260	15.....	30,375	405	55,125	735
6½.....			68,306	4,018	16.....	294,731	3,930	194,550	2,594
6¾.....			714	42	18.....	61,600	800		
6¾.....	654,435	22,828	1,565,718	56,861	18½.....			26,970	310
8.....	123,879	3,441	143,976	3,999	18¾.....	70,077	750		
8½.....			3,456	144	20.....			7,380	82
8¾.....	680,940	19,647	1,114,660	30,816	21.....	15,450	150		
10.....	315,990	7,022	198,270	3,650	21½.....	13,154	142	15,347	149
10½.....	6,420	143	473,249	9,669	25.....	2,512	25		
11.....			32,427	595	Total...	2,766,101	69,510	4,803,371	142,412

Table 231.—World Production of Crude Petroleum, 1934, 1935 and 1936

(Supplied by the Imperial Institute)

(Long tons)

Countries	1934	1935	1936
BRITISH EMPIRE			
United Kingdom (estimated) (c).....	119,000	118,000	119,000
Canada (b).....	178,594	183,116	189,921
Barbados.....	480	410	340
Trinidad (b).....	1,492,378	1,598,798	1,813,292
Bahrein Islands.....	40,700	180,700	626,000
British Borneo.....			
Brunei (exports.).....	371,591	441,744	451,621
Sarawak.....	278,037	253,714	222,452
India (b).....	1,243,341	1,245,801	1,292,709
New Zealand.....	636	760	649
Australia (Victoria).....	23	18	(a)
Total.....	3,725,000	4,024,000	4,720,000
FOREIGN COUNTRIES			
Austria.....	4,113	6,512	7,348
Czechoslovakia.....	25,561	19,631	18,369
Estonia (c).....	46,137	46,526	62,454
France.....	77,122	74,682	78,087
Germany.....	312,524	420,611	437,631
Greece.....	261		
Italy (c).....	19,861	15,725	15,852
Jugoslavia.....	472	256	135
Poland.....	520,849	506,630	502,500
Roumania.....	8,332,493	8,243,729	8,539,412
Russia.....	23,855,500	24,841,300	26,980,000
Spain (c).....	2,818	(a)	(a)
Algeria.....	367	338	303
Egypt.....	217,537	179,129	179,638
Morocco (French).....	542	108	154
Mexico (b).....	5,783,628	6,096,170	6,107,424
United States (b).....	122,711,500	134,675,100	148,606,400
Argentina (d).....	1,971,736	2,009,994	2,173,207
Bolivia.....	22,645	23,328	14,752
Colombia (b).....	2,441,958	2,473,500	2,640,700
Ecuador.....	234,145	241,000	354,431
Peru.....	2,128,063	2,217,424	2,513,600
Venezuela.....	20,385,588	21,640,000	22,582,910
China (c).....	373	(a)	(a)
Formosa (b).....	5,008	6,000	6,000
Iran (Persia).....	7,537,372	7,487,697	8,198,119
Iraq.....	1,015,195	3,624,137	3,947,535
Japan (b).....	247,817	306,391	333,600
"Manchoukuo".....	96,410	60,000	(a)
Netherlands East Indies.....	5,959,111	5,985,682	6,336,232
Total.....	204,000,000	221,000,000	240,000,000
World's Total.....	208,000,000	225,024,000	245,000,000

(a) Information not available.

(b) The following conversion rates have been used: 35 gallons=1 barrel and the under mentioned barrels=1 ton:—Canada, 7-9; Mexico, 6-6; Trinidad, 7-3; India, 7-4; United States, 7-4; Colombia, 7-1; Formosa, 7-0; Japan, 7-2.

(c) Including shale oil.

(d) Converted from cubic metres at rate of 1 cubic metre—8843 long tons.

2. The Petroleum Products Industry in Canada

Fifty petroleum refineries were in operation in Canada during 1936. These plants were located as follows—18 in Saskatchewan, 12 in Alberta, 5 in Ontario, 4 in each of Quebec, Manitoba, and British Columbia, and 1 in each of Nova Scotia, New Brunswick, and the Northwest Territories. The combined capacity of these refineries was 171,160 barrels of crude oil per day (24 hours). Sixteen plants had cracking units with a total capacity of 77,700 barrels a day.

Capital employed by the firms operating in the petroleum refining industry in 1936 aggregated \$61,307,820. The average number of employees working in 1936 was 4,935; salaries and wages paid during the year totalled \$7,193,148. Materials used in the refineries cost \$66,219,148 and the value of products made was \$85,172,981.

Crude oil used during the year amounted to 1,286,462,895 gallons; this represented a scale of operations equal to 57 per cent of refinery capacity. The United States supplied 906,642,075 gallons of the crude oil used in 1936; South American countries, 337,028,509 gallons, and Canadian wells, 42,792,311 gallons of naphtha and crude oil. Stocks of crude held at the refineries at the end of the year totalled 107,176,172 gallons of which 107,142,712 gallons were natural crude and 33,460 gallons were reduced crude.

The production of gasoline in 1936 amounted to 567,659,276 gallons; 55.7 per cent of this quantity was made by the straight[†] run process and 44.3 per cent by cracking. In addition, the refineries used for blending purposes a total of 41,208,973 gallons of imported casinghead gasoline which is not included in the production figures. The 1936 total was the highest on record, exceeding the 1935 output by 10 per cent. The value of the year's production of gasoline was \$50,586,980 at refinery prices. Stocks on hand at the end of 1936 consisted of 90,033,791 gallons of straight run and cracked gasoline and 5,231,507 gallons of imported casinghead; the latter is for blending purposes.

Production of fuel and gas oils (excluding any made and used for cracking purposes) totalled 498,317,618 gallons of which 443,747,191 gallons were for sale and 54,570,427 gallons for use as fuel in refineries. Imports amounted to 45,092,500 gallons and exports to 19,412,825 gallons. Refinery stocks on December 31 aggregated 66,709,896 gallons or 8,288,296 gallons less than at the beginning of the year.

Thirteen firms were engaged in 1936 primarily in the compounding of lubricating oils and greases. These firms produced finished products worth \$629,382 compared with the 1935 total of \$774,444. Capital employed in this industry during the year was reported at \$576,106; employment was furnished 84 persons who received salaries and wages aggregating \$116,807.

Table 232.—Materials Used and Products Made by the Oil Refineries of Canada, 1934-1936

	1934		1935		1936	
	Quantity	Value	Quantity	Value	Quantity	Value
MATERIALS USED—		\$		\$		\$
<i>Petroleum refining—</i>						
Crude oil, in its natural state from						
Canadian wells (run to stills) imp. gal.	34,304,479	2,598,824	8,507,390	547,879	42,792,311	3,219,007
Naphtha, absorption gasoline, etc., from Canadian wells (run to stills).....imp. gal.	7,157,284	640,074	32,278,083	2,467,409		
Crude oil in its natural state (run to stills)—						
(a) From the United States imp. gal.	768,765,241	38,165,168	855,159,427	40,708,492	906,642,075	46,026,181
(b) From South America.....imp. gal.			292,502,072	10,880,552	337,028,509	13,340,638
(c) From other countries.....imp. gal.	265,845,557	10,140,741	1,776,110	70,191		
Crude oil, not in its natural state (run to stills)—						
(a) From the United States imp. gal.	1,617,289	171,205	2,418,107	226,434		
(b) From other countries.....imp. gal.	31,820,493	1,926,089	3,770,254	202,376		
Benzol for blending.....(a)					359,748	54,045
Sulphuric acid (66° Bé).....lb.	24,696,413	250,501	23,098,907	224,014	22,809,518	213,433
Sulphur.....lb.	117,279	4,095	156,773	5,098	131,338	4,631
Caustic soda.....lb.	3,324,629	111,870	3,180,180	99,149	3,705,041	107,684
Soda ash.....lb.	289,418	6,636	237,466	5,280	290,677	6,350
Litharge.....lb.	356,648	26,898	388,112	26,286	349,315	24,644
Fullers' earth.....lb.	18,588,514	239,357	18,487,148	260,885	18,907,295	243,164
Compounding materials.....		338,247		356,519		479,767
Tetraethyl fluid.....		1,249,314		1,461,153		1,580,695
Other materials.....		264,055		321,699		257,249
Shipping containers.....		526,418		552,500		661,660
Total.....		56,659,492		58,415,916		66,219,148
<i>Lubricating oils and greases—Total.....</i>		<i>309,523</i>		<i>453,898</i>		<i>336,737</i>
Grand total.....		56,969,015		58,869,814		66,555,885

(a) Not itemized separately in 1934 and 1935.

Table 232.—Materials Used and Products Made by the Oil Refineries of Canada, 1934-1936—Concluded

	1934		1935		1936	
	Quantity	Value	Quantity	Value	Quantity	Value
		\$		\$		\$
PRODUCTS MADE—						
<i>Petroleum refining—</i>						
<i>Made for sale—</i>						
Gasoline (a) straight run*... imp. gal.	294,665,314	28,478,159	292,313,856	26,595,550	316,046,838	28,768,074
(b) by cracking process..... imp. gal.	166,773,271	13,956,313	221,195,579	18,566,703	251,436,449	21,800,125
Fuel oil (except for cracking) imp. gal.	300,071,842	10,560,733	417,840,170	15,647,726	443,747,191	16,708,163
Gas oils..... imp. gal.	101,549,871	5,412,798				
Tractor and engine distillate imp. gal.	36,223,392	3,183,330	39,431,237	3,410,812	33,280,176	2,963,582
V.M.&P.orsolventnaphtha imp. gal.	37,675,985	3,635,618	31,767,027	3,055,093	28,913,144	2,606,158
Kerosene..... imp. gal.	18,928,038	3,896,754	17,814,927	3,484,794	19,665,009	3,754,454
Lubricating oils..... imp. gal.	9,960,640	563,514	11,352,074	515,401	11,399,546	527,979
Grease..... lb.	25,584,495	2,303,717	34,668,858	3,119,530	34,860,569	3,031,466
Asphalt..... imp. gal.	52,467	295,111	63,843	372,723	62,077	381,473
Petroleum coke..... tons	10,655,682	476,899	11,237,594	434,918	11,347,044	413,884
Wax and candles..... lb.		171,114		43,735		11,195
Other products.....						
Total for sale.....		72,934,060		75,934,818		81,659,106
<i>Made for own use—</i>						
Gasoline (a) straight run..... imp. gal.	314,778	23,151	206,569	20,104	160,738	16,960
(b) by cracking process..... imp. gal.					15,251	1,821
Fuel oil (except for cracking) imp. gal.	53,918,147	1,836,395	52,129,538	1,930,544	54,570,427	1,995,397
Gas oils..... imp. gal.	455,465	23,484				
V.M.&P.orsolventnaphtha imp. gal.	70,255	4,245	3,560	368	1,608	202
Kerosene..... imp. gal.	66,008	5,365	66,690	5,338	73,472	5,438
Lubricating oils..... imp. gal.	48,404	12,589	48,680	11,498	53,308	12,115
Tar..... imp. gal.	1,306,410	49,927	1,213,240	48,529	304,045	12,162
Grease..... lb.	7,158	444	6,442	299	10,136	440
Asphalt..... imp. gal.	108,563	2,044	11,781	1,066	25,084	2,201
Petroleum coke..... tons	9,293	57,961	8,348	21,256	2,629	11,687
Still gas..... M cu. ft.	3,772,746	777,351	5,154,885	1,105,166	6,083,549	1,268,556
Wax and candles..... lb.	433	29			47	3
Other products.....		58,632		97,095		186,893
Total for own use.....		2,851,617		3,241,263		3,513,875
Total Petroleum refining.....		75,785,677		79,176,081		85,172,981
Fuel and gas oils made and used in pressure cracking process imp. gal.	†309,595,786		†398,176,385		§383,325,710	
<i>Lubricating oils and greases—</i>						
Lubricating oils..... imp. gal.	543,258	397,751	1,355,690	616,956	721,001	453,246
Lubricating greases..... lb.	832,201	104,042	727,324	112,431	845,800	115,262
Soaps and soap powders..... lb.	475,591	39,476	347,762	32,692		30,437
Other products.....		10,567		12,365		30,437
Total lubricating oils and greases.....		551,836		774,444		629,382
Grand total.....		76,337,513		79,950,525		85,802,363

*Includes Turner Valley naphtha and natural gasoline run to refinery stills but does not include the imported casing-head gasoline which was used for blending at the refineries

†Not including 5,473,582 gallons of heavy naphtha and 1,389,045 gallons of crude.

‡Not including 1,845,016 gallons of heavy naphtha.

§Not including 1,568,388 gallons of heavy naphtha.

CHAPTER EIGHT

THE NON-METAL MINING INDUSTRIES IN CANADA. (Other than Fuels)

Including detailed data relating to operations in the following industries:—

Abrasives	Miscellaneous—	Manganese bog
Asbestos	Actinolite	Mineral waters (natural)
Feldspar and Quartz	Barytes	Nepheline-Syenite
Gypsum	Bituminous sands	Phosphate
Iron oxides (ochre)	Fluorspar	Pyrites
Mica	Graphite	Silica brick
Salt	Lithium minerals	Sodium carbonate
Talc and soapstone	Magnesitic dolomite	Sodium sulphate
	Magnesium sulphate	Strontium minerals

THE ABRASIVES INDUSTRY IN CANADA

The abrasives industry in Canada includes two main divisions: (1) The Natural Abrasives Industry, covering the production of natural abrasives such as grindstones, pulpstones and scythestones, corundum, diatomite, volcanic dust, etc., and (2) the Artificial Abrasives and Abrasive Products Industry, which covers the manufacture of silicon carbide, fused alumina, abrasive wheels, abrasive paper, etc.

(1) Natural Abrasives

The number of active firms in the industry during 1936 totalled 8, of which 7 reported production. Capital employed was computed at \$77,279 and \$17,442 were distributed as salaries and wages to 30 employees. Fuel and electricity consumed were valued at \$3,304; the gross value of products shipped amounted to \$38,374, and the net value of same was estimated at \$34,846 as compared with a corresponding net value of \$60,824 in 1935. Production of natural abrasives in 1936 was confined to the provinces of Nova Scotia, New Brunswick, Ontario and British Columbia.

Corundum.—Corundum mining practically ceased in Canada with the commercial production of artificial abrasives by the electric furnace. The last recorded output of the mineral in the Dominion was in 1921 when grain corundum amounting to 403 tons valued at \$55,965 was exported to the United States. Corundum crystals are found in an area including several townships in Renfrew and Hastings counties in the province of Ontario. The commercial production of corundum began in this part of Ontario about 1900 with shipments reaching a maximum in 1906.

Production of corundum is now almost entirely confined to the Transvaal, Union of South Africa, where the output in 1936 totalled 4,851 short tons valued at £38,240 compared with 4,775 short tons at £36,552 in 1935. Much further work was carried out during 1936 in the Minerals Research Laboratory of the Department of Mines, Union of South Africa, with the idea of ascertaining the best method of preparation of corundum, in order to produce material in accord with users' requirements.

The greater portion of the world's production of corundum is used normally in the manufacture of abrasive wheels. The lens and optical grinding trades also utilize some of the mineral in the form of fine flour or grain.

The higher grades of emery, a mixture of magnetite and corundum, comes largely from Asiatic Turkey and Greece; emery powder is consumed chiefly in the surfacing of plate glass and in the manufacture of abrasive cloth, grinding compounds and polishing and grinding wheels.

No imports or exports of corundum, described as such, were reported in Canada during either 1934, 1935 or 1936. Imports into Canada of emery in bulk, crushed or ground, totalled

\$43,535 in 1936 compared with \$42,102 in 1935. Sand paper, glass, flint and emery paper or emery cloth imports into the Dominion amounted to \$85,398 in 1936, while corresponding imports in 1935 totalled \$114,617.

Engineering and Mining Journal "Metal and Mineral Markets", New York, quotations for emery were (October, 1937)—per ton, f.o.b. New York, domestic crude ore, first grade, \$10. Other American ore, delivered to grinders, per gross ton, \$16; Turkish and Naxos ore, \$30 to \$40. F.O.B. Pennsylvania, in 350 pound kegs: Turkish and Naxos grain emery, 7 cents per pound; Khasia, 6 cents; American, 4½ cents.

Diatomite.—Production of diatomite in Canada during 1936 totalled 615 short tons valued at \$13,650 against an output of 823 short tons worth \$33,140 in 1935. Of the shipments made in 1936 those from deposits in Nova Scotia totalled 565 short tons worth \$11,300 while the balance of production, consisting of 40 tons valued at \$2,000 and 10 tons worth \$350, originated in the provinces of Ontario and British Columbia, respectively. Producers' sales of the material during the first six months of 1937 amounted to 197 short tons valued at \$4,925 compared with 175 short tons at \$3,500 in the corresponding period of 1936.

The first officially recorded shipments of diatomite by Canadian producers were made in 1896 in which year 644 tons were produced in Nova Scotia. The maximum annual tonnage of diatomite shipped by Canadian producers was 1,789 short tons in 1933 while the highest value for yearly output was \$54,910 in 1934. The entire production in Nova Scotia during 1936 represented the output of the International Diatomite Industries Limited, East New Annan and Little River. This company operated its New Annan calcination plant throughout most of the year; the product of this plant is utilized as a filler in various trades, as a filter-aid in the sugar industry, as a metal polish base and for insulation purposes. In Ontario a few tons of diatomite were burned at Novar in the rebuilt plant of the Diatomite Refiners Co. Ltd., also in the Muskoka district the Muskoka Diatomite Limited erected a treatment plant south of Gravenhurst; this plant was expected to come into production in 1937. Shipments of refined diatomite were made during the year by the Canadian Multi-Cell Limited from its mill located at Martin's Siding; the output of this company was consigned chiefly for insulation and filtration purposes and for use as a filler.

Production in British Columbia during 1936 comprised shipments made by W. H. MacInnes from a deposit located in the Cariboo district.

The Bureau of Mines, Ottawa, reports that deposits containing medium quality diatomite are very common in some parts of Canada. Owing, however, to foreign competition and to the comparatively small Canadian demand at present, only properly prepared diatomite of the highest quality can now be successfully marketed on a scale sufficiently large to warrant the operation of a property and the erection of a plant.

Canadian prices for diatomite in 1936 varied from \$35 to \$40 per ton for concrete admixture, \$35 to \$75 for insulation and filtration material, and up to \$200 in small lots for material suitable for polishes.

Imports into Canada of diatomaceous earth or infusorial earth (Kieselguhr) ground or unground, during 1936 totalled 2,351 short tons valued at \$78,687 compared with 1,423 short tons worth \$56,832 in 1935. Statistics relating to possible exports of diatomite are not published separately by the Department of National Revenue, Ottawa.

Garnets.—No commercial production of garnets has been reported in Canada for several years. During 1935 a garnetiferous rock was crushed and screened in a mill located at Labelle, Quebec; the product was marketed for sandblasting. In 1936 a small amount of development work was reported as having been conducted on a garnet deposit located in Joly township, La Belle county, Quebec. A deposit of garnets in Ashby township, Ontario, was operated during 1923 and 1,250 tons of garnet concentrates and crude garnets were shipped to Niagara Falls, N.Y., for use as an abrasive material; there was also a shipment of 360 tons of garnets from this same deposit in 1924.

Garnet is employed chiefly in the manufacture of abrasive papers and cloths while small quantities are utilized in the grinding of plate glass and other products. Several small lots of garnet from various Canadian localities were sent during 1936 to the Bureau of Mines ore testing laboratories, Ottawa, for concentration and abrasive tests, but none was found to be quite so satisfactory as the standard garnet at present in use.

No imports of garnet, described as such, were recorded in Canada during 1935 or 1936; the mineral, however, may enter in the form of abrasive paper or combined with other abrasive imports, n.o.p.

Engineering and Mining Journal's "Metal and Mineral Markets", New York, October, 1937, quotations for garnet were—per ton, f.o.b. New Hampshire mines; concentrate, \$30; grain, \$80 to \$140. New York: Adirondack garnet concentrates, \$85. Spanish grades, \$60, c.i.f. Port of entry. Nominal.

Grinding Pebbles.—No shipments of Canadian pebbles, suitable for use as grinding material, have been reported since 1926; during that year 64 tons were shipped from deposits occurring on the north shore of Lake Superior near Jackfish. In the United States, cut cubes and tube mill liners are made from quartzite at Jasper, Minn. One of the principal consumers of flint pebbles is the ceramic industry where products, usually of a minimum iron content, are desired. Large quantities have also been employed in the fine grinding of auriferous ores.

Imports of flint and ground flint stones into Canada during 1936 totalled 1,234 short tons valued at \$23,079 compared with 2,277 short tons worth \$24,014 in 1935. Of the 1936 imports, 604 tons came from France, 404 tons from the United States, and 207 tons valued at \$2,175 from Denmark.

Grindstones, Pulpstones and Scythestones.—Production of these natural abrasives in Canada during 1936 totalled 569 short tons valued at \$24,724 compared with 708 short tons worth \$34,010 in 1935. The shipments in 1936 comprised 87 tons of pulpstones valued at \$4,500 by British Columbia firms; 122 tons of sharpening stones worth \$4,872 from New Brunswick, and 360 tons of grindstones valued at \$15,352 from New Brunswick and Nova Scotia.

Canadian pulpstone shipments in 1936 were restricted solely to British Columbia where the J. A. and C. H. McDonald Co., Vancouver, conducted quarrying operations on the northwest end of Gabriola island, near Nanaimo.

Grindstones were produced in 1936 only by the Read Stone Co., Sackville, N.B., who obtained its supply of crude stone from the vicinity of Stonehaven in the Bay of Chaleur, N.B., and from Quarry Island, Pictou county, Nova Scotia. Crude sandstone blocks for abrasive purposes were shipped by E. A. Smith from Shediac, New Brunswick.

Scythestones in 1936 were produced only by E. A. Smith, Shediac, New Brunswick, and by the Read Stone Company of Sackville, New Brunswick.

A report (No. 786) issued by the Bureau of Mines, Ottawa, states:—"The large size Canadian grindstones are mainly used for sharpening pulp-mill and tobacco knives, and in the United States they are used in the file, machine knife, granite tool, and shears manufacturing industries. The small stones are used for scythe and axe grinding. Substantial competition from the artificial grinding wheel and to some extent from foreign natural stones was felt.

"There is a demand for good pulpstones, particularly for use in the larger magazine grinders, but as deposits containing thick beds of the proper quality sandstone are very scarce in Canada, only about 1 per cent of the stones used in Canadian pulp mills is being produced in the Dominion.

"The artificial pulpstones made of silicon carbide segments and also more recently of fused alumina segments are gradually but surely replacing the natural stone."

Imports into Canada during 1936 of unmounted grindstones, not less than 36 inches in diameter, numbered 1,013 valued at \$122,028 while imports of grindstones, n.o.p., in the same year numbered 5,180 worth \$6,968. Imports in 1936 of bonded grinding stones and wheels were valued at \$92,884.

Volcanic Dust.—For some years intermittent shipments of volcanic dust were made from deposits occurring near Williams Lake in British Columbia and from near Swift Current, Saskatchewan. No production of the material was reported in Canada during either 1935 or 1936.

Volcanic dust is consumed principally as an abrasive base in the manufacture of cleansers and polishes. The material has also been employed in concrete admixture, acoustic plasters, sweeping compounds and cold water calcemines.

Data relating to possible imports of volcanic dust are not published separately by the Department of National Revenue, Ottawa, and any such imports would probably be included under imports of pumice and pumice stone, lava and calcareous tufa, the value of which was \$21,275 in 1936.

Table 233.—Capital Employed in the Natural Abrasives Industry in Canada, 1936

	\$
CAPITAL EMPLOYED AS REPRESENTED BY:—	
(a) Present cash value of the land (excluding minerals).....	4,038
(b) Present value of buildings, fixtures, machinery, tools and other equipment.....	4,058
(c) Inventory value of materials on hand, ore in process, fuel and miscellaneous supplies on hand.....	1,860
(d) Inventory value of finished products on hand.....	7,380
(e) Operating capital (cash, bills and accounts receivable, prepaid expenses, etc.).....	59,943
Total.....	77,279

Table 234.—Employees, Salaries and Wages in the Natural Abrasives Industry in Canada, 1936

	Number			Salaries and wages
	Male	Female	Total	\$
Salaried employees.....	5		5	6,530
Wage earners.....	25		25	10,912
Total.....	30		30	17,442

Table 235.—Wage-Earners, by Months, in the Natural Abrasives Industry, 1936

Month	No.	Month	No.
January.....	22	July.....	39
February.....	11	August.....	44
March.....	17	September.....	29
April.....	14	October.....	25
May.....	23	November.....	25
June.....	36	December.....	17

Table 236.—Production (Sales) of Natural Abrasives in Canada, 1935 and 1936

Province	Diatomite		Grindstones, Pulpstones and Seythstones	
	Tons	\$	Tons	\$
1935				
Nova Scotia.....	666	26,660	50	2,006
New Brunswick.....			456	21,175
Ontario.....	100	4,600		
Saskatchewan.....				
British Columbia.....	57	1,880	202	10,829
Total.....	823	33,140	708	34,010
1936				
Nova Scotia.....	565	11,300	70	2,242
New Brunswick.....			412	17,982
Ontario.....	40	2,000		
Saskatchewan.....				
British Columbia.....	10	350	87	4,500
Total.....	615	13,650	569	24,724

Table 237.—Production of Diatomite in Canada, 1927-1936

NOTE.—For years 1896 to 1926, see previous reports.

Year	Tons	Value	Year	Tons	Value
		\$			\$
1927.....	266	6,650	1932.....	1,496	29,509
1928.....	368	8,960	1933.....	1,789	36,648
1929.....	429	10,330	1934.....	1,372	54,910
1930.....	554	13,247	1935.....	823	33,140
1931.....	1,610	32,789	1936.....	615	13,650

Table 238.—World Production of Diatomaceous Earth, 1934-1936

(Supplied by *Imperial Institute*)

(Long tons)

Producing country	1934	1935	1936
BRITISH EMPIRE			
Great Britain.....			1,086
Northern Ireland.....	5,269	4,893	7,466
Canada.....	1,225	735	549
Barbados.....	2	10	10
Australia.....	3,355	3,014	2,778
Union of South Africa.....		169	96
FOREIGN COUNTRIES			
Bulgaria.....			62
Denmark (moler).....	40,000	47,200	61,000
Finland.....	626	984	1,378
France.....	6,900	7,150	(a)
Germany (d).....	4,255	5,827	6,112
Hungary (exports).....	1,411	1,376	1,197
Italy.....	2,264	3,007	3,701
Norway (exports).....	84	140	229
Portugal.....	228	4,413	64
Roumania (c).....	512	(a)	(a)
Spain (estimated).....	2,200	(a)	(a)
Sweden.....	1,102	1,207	1,095
Algeria.....	9,772	11,200	11,922
United States.....	(b) 72,721	(b) 72,721	(a)
Japan.....	13,300	(a)	(a)
Korea.....	2,850	3,440	(a)
Netherlands East Indies.....	95	88	124

Diatomaceous earth is also produced in U.S.S.R. (Russia).

(a) Information not available.

(b) Annual average production for years 1933 to 1935.

(c) Converted from cubic metres at the rate of 1 cubic metre=2 long tons.

(d) Production of Hessen only.

Table 239.—Production of Grindstones in Canada, by Provinces, 1927-1936

(For the years 1886 to 1926, see Mineral Production of Canada, 1928)

Year	Nova Scotia		New Brunswick		Canada	
	Tons	Value	Tons	Value	Tons	Value
		\$		\$		\$
1927.....	11	220	1,306	47,255	1,317	47,475
1928.....			1,250	45,901	1,250	45,901
1929.....	6	110	1,032	37,291	1,038	37,401
1930.....	6	110	229	9,764	235	9,874
1931.....			198	8,164	198	8,164
1932.....	12	433	188	8,903	209	9,336
1933.....	21	868	140	6,211	161	7,079
1934.....	50	1,762	303	12,781	353	14,543
1935.....	50	2,006	323	12,495	373	14,501
1936.....	70	2,242	290	13,110	360	15,352

Table 240.—Production of Pulpstones and Sharpening Stones in Canada, 1927-1936

Year	Pulpstones		Sharpening stones		Year	Pulpstones		Sharpening stones	
	Tons	Value	Tons	Value		Tons	Value	Tons	Value
		\$		\$			\$		\$
1927.....	911	75,242	23	2,300	1932.....	60	3,500	68	2,899
1928.....	581	52,659	24	2,400	1933.....	214	9,870	123	4,970
1929.....	754	62,336	155	6,617	1934.....	523	27,225	111	4,710
1930.....	573	49,897	22	2,250	1935.....	288	14,109	47	5,400
1931.....	342	27,305	81	2,634	1936.....	87	4,500	122	4,872

Table 241.—Consumption of Pulpstones by the Canadian Pulp and Paper Industry, 1932-1936

Year	Number for 2 ft. wood	Value	Number for 2-5 ft. wood	Value	Number for 4 ft. wood	Value
		\$		\$		\$
1932.....	210	65,450	139	46,436	222	249,373
1933.....	321	98,475	95	31,945	199	223,635
1934.....	378	103,811	84	29,680	268	292,359
1935.....	417	116,501	52	20,297	237	243,805
1936.....	463	120,227	61	19,478	253	281,265

2. The Artificial Abrasives and Abrasive Products Industry

The value of all products made by the abrasives manufacturers during 1936 was 23 per cent greater than in 1935 and higher than in any other year on record. The gross factory value for the industry was \$10,631,533 in 1936 compared with \$8,643,930 in 1935, \$7,414,853 in 1934, and \$8,961,951 in 1929.

Fifteen establishments made artificial abrasives and abrasive products in 1936, 14 being in Ontario and 1 in Quebec. The average number of employees was 1,149 and payments in salaries and wages totalled \$1,528,194. Expenditures for manufacturing materials amounted to \$3,164,252, and a further \$967,236 was paid out for fuel and electricity. Capital employed totalled \$6,241,502 of which \$2,997,891 represented the present value of plants and equipment.

Artificial abrasives were made in 5 works in Ontario, and 1 in Quebec. The output of these works was valued at \$8,891,114, including 23,805 tons of crude silicon carbide at \$2,299,602, 59,533 tons of crude fused alumina at \$5,762,217 and other products and by-products such as ferrosilicon, firesand, fused magnesia, refractory brick and cements, boron carbide, boron carbide shapes, artificial graphite, etc.

Abrasive products such as wheels, paper, cloth, pulpstones and sharpening stones were made in 9 different plants in 1936; 7 of these made wheels, segments, files, etc., and 2 made abrasive cloth and paper. The value of all products made in these establishments was \$1,740,419 and the value of wheels and segments only was \$862,283.

The exports of crude artificial abrasives totalled 85,186 tons valued, for export purposes, at \$5,132,041 during the calendar year 1936, all of the Canadian output being shipped to the United States for grinding and grading. The exports of abrasive wheels were valued at \$129,431 in 1936.

The imports of crushed or ground artificial grains were appraised at \$520,655 in 1936, and the imports of manufactured grinding wheels were valued at \$85,545.

Table 242.—Artificial Abrasives Manufactures, 1935 and 1936

Products	1935		1936	
	Quantity	Selling value at works	Quantity	Selling value at works
		\$		\$
Crude silicon carbide.....short ton	18,475	1,788,657	23,805	2,299,602
Crude fused alumina.....short ton	51,194	4,735,019	59,533	5,762,217
Silicon carbide firesand, etc.....short ton	2,249	42,703	2,411	38,800
Abrasive wheels and segments.....xxx		785,777		862,283
Sharpening stones and files.....xxx		83,013		89,524
Ferrosilicon.....short ton	4,496	47,324	6,935	81,295
Other products (x).....xxx		1,161,437		1,497,812
Total.....		8,643,930		10,631,533

(x) Includes abrasive cloth, abrasive paper, tiles, artificial pulpstones, artificial graphite, boron carbide, boron carbide shapes, calcium boride, fused magnesia, refractory cements, firebrick, etc., each of which was reported by only one or two companies.

Table 243.—Minerals and Coke Used in Manufacturing, 1935 and 1936

Materials	1935		1936	
	Quantity	Cost at works	Quantity	Cost at works
	Tons	\$	Tons	\$
Bauxite and pure alumina.....	57,606	1,230,427	67,631	1,493,571
Coal (not for fuel)—For fused alumina.....	580	3,015	770	4,138
For silicon carbide.....	5,497	33,981	7,459	44,708
Coke (not for fuel)—For fused alumina.....	1,892	10,748	3,333	17,568
For silicon carbide.....	20,093	260,008	24,745	332,010
Feldspar.....	34	939	36	999
Salt.....	257	2,212	337	2,671
Silica sand.....	32,626	165,764	44,455	217,499
Natural abrasive grains—Garnets.....	271	30,808	101	17,849
Other.....			114	6,538
Bonding and bushing materials—Clay bonds.....	217	13,949	265	17,038

Table 244.—Imports into Canada and Exports of Abrasives, 1935 and 1936

	1935		1936	
	Quantity	Value	Quantity	Value
		\$		\$
IMPORTS				
Artificial abrasive grains, crushed or ground, when imported for use in Canadian manufactures.....		437,426		520,655
Diamond dust or bort, and black diamonds for borers.....		1,595,895		2,429,480
Emery in bulk, crushed or ground.....		42,102		43,535
Grinding wheels, manufactured by the bonding together of either natural or artificial abrasives.....		76,246		85,545
Grinding stones or blocks manufactured by the bonding together of either natural or artificial abrasives.....		9,253		7,339
Grindstones, not mounted, and not less than 36 inches in diameter. No. 1,089		140,208	1,013	122,028
Grindstones, n.o.p.....No. 3,683		4,015	5,180	6,968
Pumice and pumice stone, lava and calcareous tufa, not further manufactured than ground.....		30,971		21,275
Sand paper, glass, flint and emery paper or emery cloth.....		114,617		85,398
Iron sand or globules, or iron shot, and dry putty, adapted for polishing glass or granite or for sawing stone.....		26,359		23,184
Manufactures of emery or of artificial abrasives, n.o.p.....		43,616		55,305
Diatomaceous earth or infusorial earth (kieselguhr), ground or unground.....Cwt. 38,470		56,832	57,031	78,687
Sand, silica, for glass and carborundum manufacture, for use in steel foundries, filtration plants and sand blasting.....Cwt. 2,471,515		282,930	2,872,217	270,824
Flint and ground flint stones.....Cwt. 45,549		24,014	24,686	23,079
Total.....		2,884,484		3,773,302
EXPORTS				
Grindstones, manufactured.....		74		1,688
Abrasives—				
Natural, n.o.p., in ore or bulk, crushed or ground(*).....Cwt. 11,128		15,501	9,661	15,200
Artificial, crude, including carborundum.....Cwt. 1,401,635		3,925,364	1,703,721	5,132,041
Artificial, made up into wheels, stones, etc.....		51,676		129,431
Total.....		3,992,615		5,278,360

(*) Including infusorial earth, rotten stone, tripoli, etc.

THE ASBESTOS MINING INDUSTRY

Canadian asbestos production totalled 301,287 short tons valued at \$9,958,183 in 1936. The output of the mineral during the year represents an increase of 43.2 per cent in quantity and 41.1 per cent in value over the 210,467 short tons worth \$7,054,614 produced in 1935. The tonnage of shipments in 1936 was only surpassed, in the history of Canadian asbestos mining, by that of 1929 and the total value of sales for the year under review was the highest recorded during the past seven years.

The quantity of asbestos rock mined in 1936 totalled 4,692,004 short tons compared with 2,852,118 short tons in 1935; in 1936 crude rock milled amounted to 3,568,992 tons or an increase of 58.1 per cent over the previous year.

Distinct increases in the value of both imports and exports of asbestos were realized in 1936. The total value of imports, including those for asbestos brake and clutch lining, packing, and various manufactures, totalled \$888,787 in 1936 as against \$712,297 in 1935. Total asbestos exports during 1936, and including manufactures, were appraised at \$10,133,898, an increase of 43.5 per cent over 1935. The value of asbestos exports, other than sand or waste and manufactures, totalled \$7,391,517 in 1936 compared with \$5,300,176 in 1935. Of the total value of all Canadian asbestos exports in 1936, those to the United Kingdom amounted to \$577,012 while those consigned to the United States totalled \$6,403,649.

Expansion in production as experienced during 1936 continued throughout the first six months of 1937 when sales of all grades totalled 197,800 tons valued at \$6,678,083 compared with 120,437 tons at \$4,016,912 during the corresponding period of the preceding year.

General improvement in the asbestos mining industry in 1936 was strongly reflected in the statistics pertaining to employment. During the year, 2,647 persons were provided with work and \$2,642,924 were distributed in salaries and wages; this represented increases over 1935 of 27.8 per cent and 38.8 per cent, respectively.

Fuel and electricity consumed in the mining and milling of crude asbestos during 1936 amounted to \$979,193, of which the two largest items were electricity and coal, the value of the first named amounting to \$698,067 while that of the latter totalled \$265,816. Explosives, drill steel, and various other process supplies consumed during the year aggregated, in value, \$1,420,282.

The Quebec Bureau of Mines summarized the 1936 asbestos mining operations as follows:—"Asbestos Corporation Limited operated its King mine, Thetford, to its capacity during the whole year. The company has started to outline a second set of blocks below the ones which were caved. The block-caving method of mining is continuing to give excellent results.

"The Beaver mine during the first half of the year was worked, by a small shift of men only, for the production of crude fibre and also of chromite. In May, mining of asbestos rock was resumed on a larger scale and continued the rest of the year. The British-Canadian mine, at Black Lake, which had been closed since 1931, was reopened in June, and the Vimy-Ridge mine at Coleraine was brought up to normal operation in March, 1936. The Bennet-Martin mine, at Thetford, closed since 1923, was reopened for the recovery of crude. These mines of Asbestos Corporation are hoisting 9,000 tons of rock per day.

"The Bell mine was operated without interruption, by Keasbey and Mattison, during the greater part of the year, and latterly by the Bell Asbestos Mines, Ltd., a recently incorporated Canadian company . . .

"All the other asbestos producers, Canadian Johns-Manville at Asbestos, Johnson's Company at Thetford and Black Lake, and Quebec Asbestos Company at East Broughton also operated their mines with greater activity than had obtained for many years."

During the year milling and diamond drilling operations only were carried on at Norbestos by Nicolet Asbestos Mines Limited.

In Ontario the Rahn Lake Mines Corp. Ltd., conducted both surface and underground development work at its property located in Bannockburn township; approximately 2,000 tons of asbestos bearing rock were reported as now being on the dump.

Canadian asbestos as produced commercially in Canada at the present time is of the chrysotile or serpentine variety and is of high quality. It is derived entirely from mines operated in the Eastern Townships, Quebec. Reserves of milling grade asbestos rock in this district have been reported as sufficient for many years of commercial fibre production.

World production of asbestos in 1936, as estimated by the League of Nations from latest available figures, totalled 500,000 metric tons, an increase of 36 per cent over 1935. Canada

definitely retains a premier position as the world's largest producer of high grade asbestos, the output of the mineral in the Dominion during 1936 comprising approximately 55 per cent of the world's total production.

***Prices.**—(U.S.A., September, 1937): Per ton, f.o.b. Quebec mines, tax and bags included: Crude No. 1, \$550 to \$600; Crude No. 2, \$200 to \$225; spinning fibres, \$90 to \$170; magnesia and compressed sheet fibres, \$100 to \$110; various grades shingle stock, \$45 to \$75; various grades paper stock, \$32.50 to \$37.50; cement stock, \$19 to \$23; floats, \$16 to \$18.50; shorts, \$11 to \$14.50.

Per ton, c.i.f. New York: Rhodesian No. 1, \$250; Rhodesian No. 2, \$225.

Per ton, c.i.f. New York: Russian Crude: A. A. \$550; No. 1, \$225; No. 2, \$190; shingle, stock, \$55.

Per ton, f.o.b. mines, Vermont: Shingle stock, \$47.50; paper stock, \$35; cement stock, \$23; shorts, \$11 to \$12.

GENERAL REVIEW

At the National Research Laboratories, Ottawa, microscopic studies of asbestos fibre have been undertaken by Messrs. D. Wolchow and A. Van Winsen with a view of obtaining further information on the physical nature of fibre masses. A survey of the various uses of asbestos has also been commenced, the purpose of which is to further the uses of asbestos and to provide a means of closer co-operation between the producers and users of asbestos fibre. A comprehensive investigation of the effects of heat on asbestos fibre and asbestos textiles is also being conducted at the Ottawa Research Laboratories.

Union of South Africa.—"Chrysotile is the ordinary type of asbestos fibre most commonly used in industry for asbestos textile, brake linings, etc. Crocidolite or Blue Asbestos of commercial grade works up easily into a mass of fibres that are flexible and have a silky feel, its tensile strength is greater than that of chrysotile and it withstands acid and sea water better, but fuses at lower temperatures; it is used principally in the manufacture of filter cloth, boiler mattresses, etc.; it is graded according to quality and length and marketed in various grades from $1\frac{1}{2}$ inch in length to $\frac{1}{8}$ inch in length under the producers' own marks. Amosite asbestos is white to yellowish-grey and pale green, working up to a white fibre; the fibre is not on the whole as fine as in chrysotile; its tensile strength and resistance to acids and sea water are better than those of chrysotile; it fuses less readily than crocidolite. Amosite is not graded according to length as in the case of other varieties but is graded on colour and quality of fibre; the best grades sold are from $1\frac{1}{2}$ inch upwards in length and of ash grey colour and good tensile strength.

"The Union of South Africa is unique among the asbestos-producing countries of the world in that it can supply these three types of asbestos, each of which possesses certain favourable properties for specific industrial applications."—(Department of Mines, Union of South Africa.)

PRODUCTION OF ASBESTOS BY KINDS IN THE UNION OF SOUTH AFRICA, 1935 AND 1936

	1935		1936	
	Tons	£	Tons	£
Amosite.....	4,683	46,170	4,823	80,701
Chrysotile.....	15,483	136,268	16,149	159,156
Blue.....	2,541	43,729	4,264	97,372
Total.....	22,707	226,167	25,236	337,229

Cyprus.—"The Amiantos mine is included in a lease area held formerly by the Cyprus and General Asbestos Co. Limited and was transferred during the year under report to the Tunnel Asbestos Cement Co. Limited.

"Operations were intensified, and several new quarries were opened. The output of graded fibres amounted to 9,506 tons, an increase of nearly 2,000 tons compared to the previous year. During the first half of 1936 production was hindered owing to an abnormally wet spring, the asbestos-bearing rock being only amenable to treatment when in a dry condition.

*From the Engineering and Mining Journal *Metal and Mineral Markets*, New York.

"Six primary mills and one fibre mill were in operation during the year, the tonnage of rock treated amounting to 290,472 tons while 1,421,229 tons of rock were actually quarried. The company contemplated the re-conditioning of two more primary mills which are expected to be in operation in 1937."—(J. A. Bevan, Inspector of Mines and Labour, Cyprus.)

Southern Rhodesia.—"Southern Rhodesia asbestos is all of the chrysotile variety and occurs in various parts of the country although the two principal districts are in the Mashaba Hills in the Victoria district and in the Shabani mineral belt in the Belingwe district. The Shabani mine produces high grade asbestos fibre and contributes 75 per cent of the total production of the country. King and King A mines in the Mashaba Hills produce 15 per cent of the total output, but the product is mainly shingle fibre. The Nil Desperandum mine near Shabani produces 8 per cent of the total output, and the remaining 2 per cent is accounted for by several small mines in the Vukwe mountains, the Umvukwe range and near Filabusi. All the larger producers are under the control of Turner and Newall Ltd., who also control the bulk of the asbestos manufacturing industry of the United Kingdom. There is only a small local consumption of short fibre for asbestos-cement goods and the bulk of the output is exported, mainly through the Port of Beira in Portuguese territory. About 17 per cent of the total output consists of textile fibre. The output in 1936 amounted to 50,309 tons."—(*Imperial Institute*, London.)

United States.—"Domestic consumption of asbestos has regained the volume of pre-depression years, although the value is considerably lower. This probably does not indicate a lowering of prices, but a larger use of the lower-priced short fibres. Domestic production of asbestos (unmanufactured) amounted to 10,845 short tons in 1936 compared with 9,415 in 1935, an increase of 15.2 per cent. The quantity sold or used by producers in 1936 (11,012 tons valued at \$309,994) increased 23.5 per cent in quantity and 5.8 per cent in value over 1935. Most of that sold was short fibre chrysotile from Vermont. Amphibole asbestos was mined in Maryland, Montana and North Carolina.

"Imports of unmanufactured asbestos amounted to 243,602 tons valued at \$7,524,937, a gain of about 46 per cent in quantity and nearly 47 per cent in value compared with 1935. Exports were 3,744 tons valued at \$310,197 . . . As in previous years domestic deposits furnished in 1936 only a small percentage of the requirements of raw asbestos. Small quantities of high grade chrysotile of spinning quality are obtained in Arizona, and short fibre chrysotile is produced in increasing tonnages in Vermont. Foreign supplies were obtained chiefly from Canada, South Africa and Russia. Of the 243,602 tons imported during 1936 Canada supplied 209,303."—(Advance Summary Report, United States Bureau of Mines.)

Russia.—"A number of new factories for manufacturing various asbestos products have been built in the U.S.S.R. The asbestos slate industry has been entirely reorganized and production of asbestos-cement pipes has been started. All the newly built and modernized plants now produce almost every known asbestos article including brake lining, etc. . . .

"The growth of output in the Bazhenov District in the Urals may be gauged from the fact that already in 1930 it produced 54,000 tons of asbestos, two and a half times as much as in 1913, while in 1936 the output reached 125,117 tons. Second place is held by Eastern Siberia. Asbestos is also found in the north Caucasus, the South Urals, Kazakhstan, Central Asia and elsewhere. In 1936 exports of Ural asbestos amounted to 28,317 tons compared with 12,389 tons in 1913. The Soviet asbestos industry is taking measures to improve the quality of the asbestos produced; production in the Bazhenov mines has been completely mechanized and new concentration plants have been built."—(American-Russian Chamber of Commerce.)

Japan.—"The Miyoshi Asbestos Mining Co. is now in a position to make the first shipment of 100 tons of asbestos from Manchuria to Japan, to be followed by another shipment of the same amount, according to the press (November, 1936). Operating at present 2 mining areas, the daily output of the company is about 7 tons."—(United States Department of Commerce.)

"It is of interest to note that shipments to Japan from Russia decreased during the year 1935 when compared with those of the two previous years. Manchoukuo is a new source of supply, and although the length of fibre compares favourably with Canadian top grades, at the same time it is very harsh and suitable only for use in the manufacture of low grade products . . . The demand in Japan for asbestos fibre has increased annually during the past five years, rising from 8,385 short tons in 1932 to 23,792 tons in 1935."—(Commercial Intelligence Journal, Department of Trade and Commerce, Ottawa.)

Swaziland.—"There has been much activity recently in connection with the exploitation of chrysotile asbestos deposits on the Havelock and Kobolongo concessions in the north-west of the Territory. So far only a small output of 4 tons from development work has been recorded, but a mill, grading plant and aerial ropeway to Barberton are under construction. It is intended that the Havelock mine shall take the place of the Amianthus mine near Barberton, as the deposits there are practically exhausted."—(Imperial Institute, London.)

Kenya.—According to a report issued by the Imperial Institute, London (The Mineral Position of the British Empire), a company has been formed to reopen old asbestos workings beside the railway at Mtito Andei, about midway between Nairobi and Mombasa.

Table 245.—Capital Employed in the Asbestos Industry in Canada, 1936

	\$
1. Capital employed as represented by:—	
(a) Present cash value of the land (excluding minerals).....	9,234,534
(b) Present value of buildings, fixtures, machinery, tools and other equipment.....	6,561,540
(c) Inventory value of materials or hand, ore in process, fuel and miscellaneous supplies on hand.....	565,735
(d) Inventory value of finished products on hand.....	1,218,413
(e) Operating capital (cash, bills and accounts receivable, prepaid expenses, etc.).....	1,297,104
Total.....	18,877,326

Table 246.—Employees, Salaries and Wages in the Asbestos Industry in Canada, 1936

	Number			Salaries and wages
	Male	Female	Total	
Salaried employees.....	163	32	195	330,565
Wage-earners—				
Mine.....	1,301		1,301	
Mill.....	1,151		1,151	2,312,359
Total.....	2,452		2,452	2,312,359
Grand total.....	2,615	32	2,647	2,642,924

Table 247.—Wage-Earners Employed, by Months, in the Asbestos Mining Industry in Canada, 1936

Months	Mine		Mill
	Surface	Under-ground	
January.....	933	125	953
February.....	914	129	921
March.....	878	124	948
April.....	862	125	954
May.....	1,060	138	1,153
June.....	1,135	139	1,174
July.....	1,198	147	1,210
August.....	1,278	148	1,261
September.....	1,398	164	1,265
October.....	1,413	192	1,318
November.....	1,420	202	1,317
December.....	1,264	222	1,334

Table 248.—Sales and Shipments (*) of Canadian Asbestos, 1934, 1935 and 1936

	1934		1935		1936	
	Tons	\$	Tons	\$	Tons	\$
Crudes.....	1,663	409,853	2,278	539,558	3,440	790,971
Fibres.....	77,465	3,456,399	102,270	4,873,255	133,288	6,483,946
Shorts.....	76,852	1,070,074	105,919	1,641,801	164,559	2,683,266
Total.....	155,980	4,936,326	210,467	7,054,614	301,287	9,958,183
Sand, gravel, and stone (waste rock only) (a)	4,672	3,480	3,025	2,053	3,103	2,356

(*) All from the province of Quebec.

(a) This production is included under the sand and gravel industry.

Table 248 (a).—Asbestos Rock Mined and Milled, 1934-1936

	1934	1935	1936
	Tons	Tons	Tons
Quantity of rock mined.....	2,320,750	2,852,118	4,692,004
Quantity of rock milled.....	1,935,129	2,256,994	3,568,992

Table 249.—Sales and Shipments of Asbestos, 1926-1936

Year	Tons	\$	Year	Tons	\$
1927.....	274,778	10,621,013	1932.....	122,977	3,039,721
1928.....	273,033	11,238,360	1933.....	158,367	5,211,177
1929.....	306,055	13,172,581	1934.....	155,980	4,936,326
1930.....	242,114	8,390,163	1935.....	210,467	7,054,614
1931.....	164,296	4,812,886	1936.....	301,287	9,958,183

Table 250.—Imports of Asbestos into Canada, 1935-1936

Item	1935		1936	
	Tons	Value	Tons	Value
		\$		\$
Asbestos in any form other than crude, and all manufactures of, n.o.p.....		420,469		506,646
Asbestos packing.....	60	56,208	84	60,978
Asbestos brake and clutch lining.....		235,620		321,163
Total.....		712,297		888,787

Table 251.—Exports of Canadian Asbestos by Countries of Destination 1935 and 1936

Country and destination	1935		1936	
	Tons	Value	Tons	Value
		\$		\$
Asbestos—				
United Kingdom.....	4,584	290,569	6,817	405,712
United States.....	61,059	3,079,366	77,691	4,052,187
Australia.....	2,004	99,632	2,055	103,271
Belgium.....	4,814	270,606	8,058	455,828
France.....	3,781	254,142	6,968	473,406
Germany.....	4,913	438,062	12,811	937,125
Italy.....	806	74,435	136	11,444
Japan.....	15,597	628,597	21,200	856,167
Netherlands.....	1,671	110,725	148	5,634
Spain.....	710	37,328	201	11,182
Poland and Danzig.....	114	7,325	302	21,684
Other Countries.....	133	9,389	160	7,877
Total.....	100,186	5,300,176	136,547	7,391,517
Asbestos Sand and Waste—				
United Kingdom.....	3,595	75,516	4,566	84,711
United States.....	92,810	1,440,995	146,081	2,350,527
Belgium.....	833	14,407	1,606	27,364
France.....	320	6,200	967	18,747
Germany.....	1,438	28,805	3,547	71,365
Netherlands.....	709	14,776	110	2,233
Other Countries.....	329	4,782	801	12,396
Total.....	100,025	1,585,481	157,678	2,567,343
Asbestos Manufactures, including Asbestos Roofing—				
United Kingdom.....		119,878		86,589
United States.....		444		935
Newfoundland.....		6,345		6,818
Australia.....		7,529		30,106
Argentina.....		3,826		6,536
Brazil.....		7,598		11,511
Chile.....		3,212		2,331
Colombia.....		4,535		2,372
Mexico.....		8,577		9,857
Peru.....		2,855		2,947
Other Countries.....		10,649		15,034
Total.....		175,452		175,038

The Asbestos Products Industry in Canada

Manufactures of asbestos products in Canada were valued at \$1,293,909 in 1936 compared with \$1,130,282 in 1935. The chief products in 1936 were: woven and moulded brake linings, \$392,309; boiler and pipe coverings, \$162,216; packings, \$113,821; clutch facings, \$91,147; and gaskets, \$21,216. Asbestos shingles, blackboards, paper, millboard, yarn, dryer felts, etc., were also manufactured but as there were only one or two producers in each case, the output figures cannot be shown separately.

A total of 13 plants reported in this industry in 1936; 6 were located in Quebec, 6 in Ontario, and 1 in Nova Scotia. Capital employed in manufacturing operations amounted to \$1,955,676, the number of workers was 372, and salaries and wages totalled \$376,574. Purchased materials for manufacturing cost \$622,530.

Table 252.—Products Manufactured in the Asbestos Products Industry, 1935 and 1936

Products	Unit of measure	1935		1936	
		Quantity	Gross selling value at works	Quantity	Gross selling value at works
			\$		\$
Asbestos brake linings—Moulded	ft.	2,927,962	439,904	1,603,835	252,417
Woven	ft.			954,357	139,892
Asbestos boiler and pipe coverings	ft.	1,477,121	136,157	1,757,708	162,216
Asbestos clutch facings	No.	416,311	78,131	560,871	91,147
Asbestos gaskets	lb.	46,289	24,501	33,655	21,216
Asbestos packings	lb.	229,724	107,824	257,780	113,821
Other asbestos products (1)	x x		172,647		255,872
All other products (2)	x x		171,118		257,328
Total			1,130,282		1,293,909

(1) Includes asbestos blackboards, millboard, paper, shingles, yarn, cloth, cements, dryer felts, etc.

(2) Includes packings of rubber, duck and flax; brass rivets, rock wool and eel grass insulation.

Table 253.—Materials Used in the Manufacture of Asbestos Products, 1935 and 1936

Materials	Unit of measure	1935		1936	
		Quantity	Cost at works	Quantity	Cost at works
			\$		\$
Asbestos fibre	lb.	5,321,075	75,147	9,084,553	149,649
Asbestos cloth and strips	lb.	47,121	19,233	35,096	14,207
Asbestos paper, corrugated or plain	lb.	350,623	14,940	147,136	6,947
Asbestos yarn	lb.	347,039	87,513	216,992	58,214
Portland cement	lb.	463,803	3,754	467,185	2,634
Cotton cloth, yarn and waste	x x		37,647		51,893
Rubber	lb.	47,939	7,639	36,071	3,152
Containers, boxes, etc.	x x		41,168		69,842
All other materials	x x		231,953		265,992
Total			518,994		622,530

Table 254.—World Production of Asbestos, 1934-1936

(Supplied by Imperial Institute)

(Long tons)

Producing country and description	1934	1935	1936	Producing country and description	1934	1935	1936
BRITISH EMPIRE				FOREIGN COUNTRIES			
Southern Rhodesia.....	28,762	38,034	50,309	Bulgaria.....	3	3	.....
Union of South Africa—				Czechoslovakia.....	2,100	2,600	2,700
Amosite.....	2,552	4,031	5,323	Finland.....	3,629	3,400	7,000
Blue.....	2,413	2,097	2,955	France.....	400	450	(a)
Chrysotile.....	11,186	12,105	13,469	Greece.....	30	2	—
Anthophyllite.....			65	Italy.....	2,216	(a)	(a)
Canada—				U.S.S.R. (Russia).....	90,740	93,975	123,141
Chrysotile (b).....	143,439	190,618	271,777	United States (sales)—			
Crude.....	1,485	2,034	3,071	Chrysotile.....	5,843	8,406	9,322
Fibre.....	69,165	91,815	119,007	Amphibole.....			
Shorts.....	68,618	94,570	146,928	Argentina.....		13	(a)
Sand and gravel (waste rock only).....	4,171	2,701	2,771	China.....	285	(a)	(a)
Actinolite.....	27			French Indo-China.....			5
Cyprus.....	7,081	7,493	9,202	Japan (estimated).....	1,000	1,000	1,000
India.....	25	63	57	Korea.....		6	68
Australia.....	170	143	239	Turkey.....	4	102	117
Total.....	196,000	255,000	353,000	Total.....	106,000	113,000	147,000
				World's Total..	302,000	368,000	500,000

(a) Information not available.

(b) Sales and shipments.

FELDSPAR AND QUARTZ MINING INDUSTRY

Owing to the very close physical association of these minerals in many Canadian deposits (pegmatites) it has been found difficult for some operators to make a separation of all data pertaining to the mining of each individual mineral and, for this reason, the general statistics relating to capital, employment, fuel and electricity, etc., have been combined.

The gross value of production by the Canadian feldspar and quartz mining industry totalled \$789,682 in 1936 compared with corresponding values of \$569,212 in 1935 and \$901,998 in 1929. The number of properties reported as active in 1936 totalled 34, of which 18 were located in Quebec and 12 in Ontario; one producing property was also located in each of the following provinces—Nova Scotia, Manitoba, Saskatchewan, and British Columbia. The industry reported 324 employees and distributed \$238,848 in salaries and wages. The value of fuel and purchased electricity used totalled \$56,944, while explosives, drill steel and various other process supplies consumed amounted to \$103,969. Capital employed during the year under review was recorded at \$1,400,024.

Feldspar

Production of feldspar in Canada during 1936 totalled 17,846 short tons valued at \$154,475 compared with 17,742 short tons at \$144,330 in 1935. The output of the mineral during both these years was confined to Quebec, Ontario and Manitoba and, of the total tonnage shipped in 1936, 8,409 tons originated in Ontario and 8,115 tons in Quebec.

Exports of feldspar from Canada showed a decided improvement having increased from 9,959 short tons valued at \$59,893 in 1935 to 14,133 short tons worth \$94,537 in 1936; of the exports in the latter year, 21 short tons valued at \$520 went to the United Kingdom and 14,042 short tons at \$92,419 to the United States.

In 1936 consumption of feldspar by Canadian industries, other than glass manufacturing, was as follows—abrasives, 36 tons; imported clay products, 1,572 tons, and cleaning preparations, 939 tons. In 1935, the last year for which complete figures are available, the total consumption of feldspar in Canada, including that for glass manufacture, was 7,016 short tons.

The expansion in feldspar production experienced in 1936 continued into 1937 with the industry reporting shipments during the first six months of 8,425 short tons valued at \$77,216 compared with 7,867 short tons worth \$66,768 during the corresponding months of 1936.

Feldspar produced in Canada is chiefly of the high potash type and, during recent years, the larger production of the mineral has been derived from pegmatites occurring in the Bathurst, Sudbury, Mattawa, Hybla and Parry Sound areas of Ontario and in the Buckingham district,

Quebec. Shipments of feldspar were also made during 1936 from Lyndoch township, Renfrew county, Ontario, and from a new deposit in West Portland township, Quebec. In Manitoba, relatively small tonnages of feldspar have been shipped from a property located near Pointe du Bois in the Winnipeg river area.

A report issued by the Bureau of Mines, Ottawa, states—"Pegmatite dykes, the main source of commercial feldspar, are widely distributed throughout the Precambrian rocks of Eastern and Northern Canada, and the potential reserves of the mineral are very great. Development possibilities, however, in view of the comparatively low unit value of the mineral, hinge upon the two important factors of run-of-mine purity of rock and cost of transportation to grinding plant . . . The new operation of Canadian Nepheline Ltd., at Lakefield, Ontario, came into active production during 1936, producing crushed nepheline syenite, a material that has found high favour in the glass industry as a substitute for straight feldspar. The rock consists of a mixture of nepheline and potash and soda feldspars, having a considerably higher alumina content than feldspar. It contains a small amount of iron-bearing impurities, in the form of magnetite grains and flakes of muscovite and biotite micas, which have to be removed by magnetic separation to make a marketable product. Extensive deposits of the syenite occur in the nearby township of Methuen, Peterborough county, as well as in the Bancroft area, Hastings county. Canadian Nepheline Limited reports an exceedingly favourable reception for its products by the glass trade, both in Canada and the United States. Outside the glass trade, the product has been found to be valuable for a variety of ceramic uses and it seems likely that it may come into progressively increased demand in place of feldspar.

"In December, 1936, several drilling tests were made at the Hubert O. De Beck feldspar mine at Green Mountain, S.C., to determine the most efficient type of hammerdrill bit and drilling method for use at this particular property. The significant fact demonstrated by this test was that six-point bits not only obtained 20 per cent more footage, but also showed a 25 per cent faster drilling speed than the four point bits. However, the results obtained in these tests do not necessarily apply to every mine and may not be obtainable elsewhere. The most economical drilling method for a given mine can only be determined by the trial-and-error method."—(Mining and Metallurgy.)

"In 1936 the United States feldspar industry registered substantial improvement over 1935. Preliminary figures obtained by the National Feldspar Association indicate a 20 per cent increase over 1935 in shipments of ground feldspar. This increase was attributable largely to improvement in demand for glass making and pottery manufacture, although manufacture of enamels showed an increase of nearly 10 per cent. Significant is the relative increase in the consumption of feldspar in glass making. Whereas only a few years ago the manufacture of glass accounted for only about 30 per cent of the total consumption of feldspar, it now takes more than all other industries combined . . . during the year a new competitor for feldspar arose in the form of Canadian nepheline syenite . . . ordinary feldspar seldom contains over 18 per cent alumina, and even South Dakota spar rarely exceeds about 20 per cent. Nepheline-syenite, however, carries 24 per cent alumina and also contains a slightly higher total amount of alkalies. It is sold in Canada (1936) at \$10 a ton and is offered at \$18.38 delivered at glass works in western Pennsylvania and Ohio. Another substitute for feldspar may be available soon in the form of a by-product of certain chemical-manufacturing operations. Preliminary samples indicate the possibility of maintaining a product with the composition of a synthetic sodium-aluminum silicate with over 35 per cent alumina. Some displacement of feldspar may accompany the larger use of pyrophyllite and magnesium talc in the manufacture, particularly, of wall tile."—(Paul M. Tyler, United States Bureau of Mines.)

Table 255.—Capital Employed in the Feldspar and Quartz Mining Industry, in Canada, 1936

	\$
1. CAPITAL EMPLOYED AS REPRESENTED BY—	
(a) Present cash value of the land (excluding minerals).....	419,969
(b) Present value of buildings, fixtures, machinery, tools and other equipment.....	709,230
(c) Inventory value of materials on hand, ore in process, fuel and miscellaneous supplies on hand.....	39,583
(d) Inventory value of finished products on hand.....	144,488
(e) Operating capital (cash, bills and accounts receivable, prepaid expenses, etc.).....	86,754
Total.....	1,400,024

Table 256.—Employees, Salaries and Wages in the Feldspar and Quartz Mining Industry in Canada, 1936

	Number			Salaries and wages
	Male	Female	Total	
Salaried employees.....	26	5	31	46,098
Wage-earners.....	293		293	192,750
Total.....	319	5	324	238,848

Table 257.—Number of Wage-Earners on Pay Roll in Feldspar and Quartz Mining Industry, by Months, 1936

Month	Number
January.....	188
February.....	186
March.....	192
April.....	190
May.....	254
June.....	321
July.....	321
August.....	364
September.....	407
October.....	383
November.....	331
December.....	303

Table 258.—Production of Feldspar in Canada, by Provinces, 1927-1936

Year	Quebec		Ontario		Manitoba		Canada	
	Tons	\$	Tons	\$	Tons	\$	Tons	\$
1927.....	12,730	104,618	17,119	154,533			29,849	259,151
1928.....	12,943	104,789	18,954	180,153			31,897	284,942
1929.....	15,790	133,492	21,737	206,979			37,527	340,471
1930.....	17,074	163,802	9,722	104,667			26,796	268,469
1931.....	10,381	86,842	7,962	100,119			18,343	186,961
1932.....	3,390	39,062	3,657	42,920			7,047	81,982
1933.....	6,183	59,283	4,887	45,350	88	484	10,658	105,117
1934.....	9,207	78,853	7,302	61,665	1,793	6,763	18,302	147,281
1935.....	7,002	63,075	8,656	75,003	2,084	6,252	17,742	144,330
1936.....	8,115	75,703	8,409	70,840	1,322	7,932	17,846	154,475

In addition to the production of feldspar recorded for 1936, there were shipments of nepheline-syenite valued at \$37,426 made from a property located in Methuen township, Ontario; these shipments represented the first commercial production of this mineral in Canada. Shipments of nepheline-syenite during the first half of 1937 were valued at \$51,087.

Table 259.—Imports and Exports of Feldspar, 1931-1936

	Imports*		Exports	
	Tons	\$	Tons	\$
1931.....	1,877	37,297	10,975	88,913
1932.....	1,487	24,875	2,017	15,465
1933.....	561	7,970	3,596	23,076
1934.....	1,039	15,245	10,532	65,158
1935.....	608	11,000	9,959	59,893
1936.....	741	14,240	†14,133	94,537

*Crude and ground.

†Includes nepheline-syenite.

Table 260.—Feldspar Consumed in Specified Canadian Industries 1935-1936

Industries	1935		1936	
	Tons	\$	Tons	\$
Abrasive products	34	939	36	999
Imported clay products	1,135	21,977	1,572	28,521
Soaps and cleaning preparations	1,257	12,817	939	10,221
Iron and steel products	662	11,554	369	6,503
Glass	3,928	61,962	3,929	67,741

Prices (October, 1937).—United States: Per ton, f.o.b. North Carolina, potash feldspar, 200 mesh, white, \$17 in bulk; soda feldspar, \$19. F.O.B. Maine, potash feldspar, white, 200 mesh, \$17, in bulk. Granular glass spar, white, 20 mesh, f.o.b. North Carolina, \$12.50 in bulk; semi-granular, \$11.75; soda feldspar, 200 mesh, white, \$19. Virginia: No. 1, 230 mesh, \$18; 200 mesh, \$17; No. 17 glassmakers', \$11.75; No. 18, \$12.50. Enamellers', \$14 to \$16. Quotations on Spruce Pine, N.C., or Keene, N.H., basis. New Mexico: crude clean No. 1 potash spar, \$5.50; ground, \$9.50. (Engineering and Mining Journal's "Metal and Mineral Markets"—New York.)

Canada: Current quotations (October, 1937) for crude Canadian feldspar, per short ton, ranged from \$4 to \$6, depending on quality and transportation charges.

Table 261.—World Production of Feldspar, 1934-1936

(Supplied by Imperial Institute)

(Long tons)

Producing country	1934	1935	1936	Producing country	1934	1935	1936
BRITISH EMPIRE				FOREIGN COUNTRIES— Concluded			
United Kingdom—				Italy	7,516	7,496	8,484
China stone	47,993	57,160	66,509	Norway	18,178	16,697	24,792
Canada (sales)	16,341	15,841	15,934	Roumania (b)	1,010	11,344	(a)
India	628	702	785	Sweden	33,924	47,869	55,902
Australia (including china stone)	2,902	4,711	3,691	U.S.S.R. (Russia)	21,788	23,844	(a)
FOREIGN COUNTRIES				Egypt		71	44
Czechoslovakia (estimated)	30,000	30,000	30,000	United States (sales)	154,188	189,550	244,726
Finland (exports)	3,276	2,038	2,480	Argentina	424	487	1,065
Germany (Bavaria only)	6,700	5,860	7,864	"Manchoukuo"	5,000	(a)	(a)
				China	22,420	(a)	(a)

(a) Information not available.

(b) Converted from cubic metres at the rate of 1 cubic metre=2 long tons.

Quartz (Silica)

Production of natural silica, including crushed quartzite, silicious fluxing sand and gravel, and crude and ground dike quartz totalled 1,046,649 short tons valued at \$597,781 in 1936 compared with 233,002 short tons worth \$424,882 in 1935. The statistics of production for these two particular years are not entirely comparable in that the production of silica sand for two of the large Ontario non-ferrous metallurgical plants was not recorded prior to 1936. Silica in one or another of the forms referred to above was produced, during 1936, in Nova Scotia, Quebec, Ontario, Manitoba, Saskatchewan and British Columbia. Silica quarried or mined during 1936 for the manufacture of ferrosilicon, glass, artificial abrasives, chemical products, sand blasting, etc., was derived from properties operated chiefly in the vicinity of Hull, Buckingham, St. Remi d'Amherst, and St. Canute in the province of Quebec; in Ontario shipments of natural silica came from deposits located near Sault Ste. Marie and Killarney. Quebec and Ontario are the two principal silica producing provinces. In 1936 the value of shipments from Quebec properties totalled \$320,634 or 53.6 per cent of the Dominion total while those in Ontario amounted to \$216,037 or 36.1 per cent.

Silica production as recorded for Nova Scotia is utilized by the primary steel industry in the manufacture of silica brick. Production in Saskatchewan represents unconsolidated low grade natural silica sand used for fluxing purposes.

Of the total 1936 silica production of 1,046,649 short tons, 890,723 short tons or 85.1 per cent represented unconsolidated low grade silicious sand utilized as smelter flux and of this quantity, 814,634 tons were consumed in Ontario smelters and 76,089 tons in Saskatchewan-Manitoba smelting operations.

Imports of silica sand in 1936 for glass manufacturing, etc., totalled 143,611 short tons valued at \$270,824 compared with 123,576 short tons worth \$282,930 in 1935. Imports of sillex (washed sand or pure crushed quartz) or crystallized quartz, ground or unground, amounted to 4,056 short tons valued at \$84,393 in 1936; corresponding imports in 1935 were 3,359 short tons valued at \$75,768. Flint and ground flint stones imported in 1936 totalled 1,234 short tons worth \$23,079.

According to the Bureau of Mines, Ottawa, the price per ton for the several grades of silica varies greatly, depending on its purity and on the purpose for which it is to be used. Silica, on the whole, is a comparatively low-priced commodity, and, therefore, the location of a deposit with respect to markets is of great importance. The larger markets for silica are in the provinces of Quebec and Ontario, and any new deposits being opened up should be within economic reach of either Toronto or Montreal. Canadian mills are now producing silica sand of different grades for steel foundries, the glass industry and for sandblasting, etc.

Table 262.—Production in Canada and Imports of Quartz and Silica Products, 1935 and 1936

	1935		1936	
	Tons	Value	Tons	Value
		\$		\$
PRODUCTION (*) (SHIPMENTS)—				
Nova Scotia.....	9,640	13,978	6,764	10,819
Quebec.....	51,948	226,839	78,975	320,634
Ontario.....	83,034	120,005	884,585	216,037
Manitoba.....	147	220	90	45
Saskatchewan.....	77,177	59,069	76,089	49,458
British Columbia.....	11,056	4,771	146	788
Canada.....	233,002	424,882	1,046,649	597,781
IMPORTS—				
Ganister.....	2,151	8,395	4,097	8,140
Flint and ground flint stones.....	2,277	24,014	1,234	23,079
Sillex or crystallized quartz, ground or unground.....	3,359	75,768	4,056	84,393
Silica sand for glass, carborundum and steel and filtration plants and sand blasting (a).....	123,576	282,930	143,611	270,824
Silica firebrick, 90 per cent + silica.....		215,500		261,974

(*) Includes both crude and crushed quartz and quartzite, silica flux and natural silica sands. See footnote to following table.
(a) 108,820 tons from the United States and 14,756 tons from Belgium in 1935 and 139,071 tons from the United States and 4,449 tons from Belgium in 1936.

Table 263.—Production (*) (Use) of Natural Low Grade Silica Sand and Silica Gravel as Non-Ferrous Smelter Flux, 1936

	Tons	\$
Ontario.....	814,634	90,925
Saskatchewan.....	76,089	49,458
Canada.....	890,723	140,383

(*) Included in totals shown in Table 262; also complete data for production of this material in Ontario during previous years are not available.

Table 264.—Production of Quartz (Silica) in Canada, 1926-1936

Year	Tons	\$	Year	Tons	\$
1926.....	232,082	553,161	1932.....	189,132	276,147
1927.....	233,984	496,364	1933.....	185,783	297,820
1928.....	282,522	523,933	1934.....	272,563	482,265
1929.....	265,949	561,527	1935.....	233,002	424,882
1930.....	226,200	413,127	1936*.....	1,046,649	597,781
1931.....	195,724	303,158			

*See footnote to Table 262.

Table 265.—Consumption of Quartz, Silica Sand, etc., in Canada, by Industries, According to Census of Industry Reports, 1935 and 1936

	1935		1936	
	Quantity	Cost at works	Quantity	Cost at works
	Tons	\$	Tons	\$
SILICA SAND AND SILICA (including ground quartz)—				
Soaps and cleaning preparations.....	4,419	72,626	4,918	79,020
Acids and salts.....	10,229	53,389	11,715	60,279
Paints.....	565	24,186	739	28,522
Refractories.....	389	2,667	285	1,778
Roofing paper.....	1,351	5,471	1,993	10,072
Abrasives.....	32,626	165,764	44,455	217,499
Polishes.....	3	246		
Glass.....	61,858	307,677	68,176	331,844
Enamelling.....	25	1,000	434	3,366
Products from imported clays.....	1,448	20,212	2,305	26,722
Foundry facings and supplies.....	15	203	36	374
Non-ferrous smelters*.....	97,556	66,463	890,723	140,383
Steel foundries.....	20,339	105,592	23,420	121,142
Total accounted for.....	230,823	825,496	1,049,199	1,021,001
QUARTZ AND QUARTZITE—				
Acids and salts.....	3,361	9,806	2,183	6,396
Ferro-alloys.....	8,829	26,284	15,777	45,661
Non-ferrous smelters.....	11,056	4,771	146	788
Total accounted for.....	23,246	40,861	18,106	52,845

NOTE.—Consumption values are costs at works.

(*) 1935 figures not complete; also the quantities reported under this industry represent low grade natural silicious sands used for fluxing purposes.

THE GYPSUM INDUSTRY

(1) Primary Production—The Gypsum Mining and Quarrying Industry

Canadian gypsum production totalled 833,822 short tons valued at \$1,278,971 in 1936 as compared with 541,864 short tons worth \$932,203 in 1935, or an increase of 53.9 per cent in quantity and 37.2 per cent in value. Shipments during 1936 were the largest in both tonnage and value since 1931 and distinctly reflect the encouraging uptrend in consumption of industrial minerals for manufacturing and other purposes.

Increases in the value of production, for the second consecutive year, were realized in Nova Scotia, New Brunswick, Ontario, Manitoba and British Columbia, the five gypsum producing provinces. Of the entire 1936 output the tonnage and value of that originating in Nova Scotia comprised 87.4 per cent and 63.2 per cent, respectively. Production as computed for the year under review comprised 757,692 short tons of crude mineral and 76,130 short tons of calcine or plaster of Paris; of the crude material shipped, 709,326 tons were in the crushed state.

In 1936 the number of firms reporting production numbered 9 and the gypsum quarries and mines in operation totalled 14. Some of the Canadian gypsum mining companies confine their operations in the Dominion to the production and shipment of crude gypsum or anhydrite, while others, in addition to marketing various grades of crude gypsum, produce a calcine for sale or for consumption in their own gypsum products plants.

Employees engaged in the mining or quarrying of crude gypsum, together with those engaged in milling or calcining operations conducted at the Canadian gypsum mines and quarries totalled 514 in 1936; salaries and wages distributed to these employees during the year amounted to \$440,297. The cost of fuel and electricity consumed by the industry totalled \$140,678 and explosives and other process supplies used were evaluated at \$78,191.

Gypsum is exported from Canada almost entirely in the crude state, the shipments of the mineral in this form to other countries during 1936 totalled 650,377 short tons valued at \$756,010 compared with an export of plaster of Paris and wall plaster of but 767 short tons worth \$19,280. Exports of crude gypsum experienced a pronounced increase over 1935, the percentage increase in tonnage and value being, respectively, 48.0 and 48.7. Of the total tonnage exported in 1936 the United Kingdom took 104,925 short tons while the balance of 545,452 short tons went to the

United States. It is interesting to note the relatively rapid increase in exports of crude gypsum to the United Kingdom during recent years for such exports of the mineral in the crude state were reported "nil" in both 1931 and 1932 whereas in 1934 exports to the United Kingdom were recorded at 31,895 short tons and 65,024 short tons in 1935.

During 1936 a new company, the Victoria Gypsum Company, commenced commercial shipments of crude gypsum from its property located near Little Narrows, Victoria county, Nova Scotia; the new and modern plant erected by this company is reported to have a capacity of from 200 to 400 tons per hour of 2-inch crushed gypsum. The year was also featured by the purchase of the Walton, Aspy Bay and Cheticamp quarries in Nova Scotia by the National Gypsum Company of Buffalo; these properties were formerly operated by the Atlantic Gypsum Products Corp. Ltd., of Boston. In the west it was reported that the Summit Lime Works had installed a calcining plant for the production of hardwall plaster from crude gypsum quarried in British Columbia.

A report issued by the Bureau of Mines, Department of Mines and Resources, Ottawa, describes the materials produced by the Canadian gypsum industry (mining and milling) as hydrous calcium sulphate, commonly known as gypsum, the partly dehydrated material known as plaster of Paris or wall plaster, and the anhydrous calcium sulphate known as anhydrite. Gypsum is marketed in the crude lump form, ground as "land plaster" and "terra alba", or ground and calcined as plaster of Paris and wall plaster. Calcined gypsum is largely employed in the manufacture of insulating material, wallboard and various other construction materials, while anhydrite is employed chiefly as a fertilizer for the peanut crop in the South Atlantic States.

The use of anhydrite in England for the manufacture of sulphuric acid, ammonium sulphate and special plasters is rapidly increasing. Canada is fortunate in having extensive deposits of this material favourably situated for commercial exploitation. When conditions are favourable, Canadian anhydrite may be used for the manufacture of special plasters similar to the material now being marketed in England. Extensive research work is now being carried on in the United States with a view to determining whether anhydrite can be partly if not wholly substituted for gypsum as a retarder in cement.—(Bureau of Mines, Department of Mines and Resources, Ottawa.)

Table 266.—Capital Employed in the Gypsum Industry in Canada, by Provinces, 1936

	Nova Scotia	New Brunswick, Ontario, Manitoba and British Columbia	Canada
	\$	\$	\$
Capital employed as represented by—			
(a) Present cash value of the land (excluding minerals).....	2,065,308	236,217	2,301,525
(b) Present value of buildings, fixtures, machinery, tools and other equipment..	1,763,181	2,594,980	4,358,161
(c) Inventory value of materials on hand, ore in process, fuel and miscellaneous supplies on hand.....	241,435	127,610	369,045
(d) Inventory value of finished products on hand.....	54,199	28,461	82,660
(e) Operating capital (cash, bills and accounts receivable, prepaid expenses, etc.)	971,624	871,639	1,843,263
Total.....	5,095,747	3,858,907	8,954,654

Table 267.—Employees, Salaries and Wages in the Gypsum Industry in Canada, 1936

	Number			Salaries and wages
	Male	Female	Total	
Salaried employees.....	58	6	64	\$ 88,786
Wage-earners—				
Mine.....	263		263	} 351,511
Mill.....	187		187	
Total.....	450		450	351,511
Grand total.....	508	6	514	440,297

Table 268.—Number of Wage-Earners on Pay Roll in the Gypsum Industry on the 15th of each Month or Nearest Representative Date, 1936

Month	Mine	Mill
January.....	116	92
February.....	71	104
March.....	70	139
April.....	194	146
May.....	239	191
June.....	333	218
July.....	399	232
August.....	392	219
September.....	356	224
October.....	348	229
November.....	368	217
December.....	256	194

Table 269.—Annual Production of Gypsum in Canada, by Provinces, 1927-1936

(For the years 1874 to 1926, see Mineral Production of Canada, 1928)

Year	Nova Scotia		New Brunswick		Ontario		Manitoba		British Columbia		Canada	
	Quantity	Value	Quantity	Value	Quantity	Value	Quantity	Value	Quantity	Value	Quantity	Value
	Tons	\$	Tons	\$	Tons	\$	Tons	\$	Tons	\$	Tons	\$
1927..	829,438	1,512,015	85,293	524,550	83,998	500,688	39,895	512,008	24,493	201,754	1,063,117	3,251,015
1928..	1,013,257	1,850,243	75,033	501,252	85,811	553,271	51,285	609,039	20,982	229,843	1,246,368	3,743,648
1929..	948,895	1,152,160	70,482	485,982	100,347	832,689	67,269	631,051	24,696	243,814	1,211,689	3,345,696
1930..	827,063	982,287	82,674	513,677	94,946	776,069	34,157	298,297	32,128	248,458	1,070,968	2,818,788
1931..	707,817	878,487	58,957	451,264	53,358	374,469	23,076	231,124	20,544	176,173	863,752	2,111,517
1932..	341,508	398,861	38,019	297,520	35,655	186,175	12,719	113,739	10,728	84,084	438,629	1,080,379
1933..	315,948	363,528	30,391	88,500	24,460	112,319	6,830	65,471	5,107	46,004	382,736	675,822
1934..	378,287	488,044	30,398	104,709	33,234	141,389	9,657	81,553	9,661	48,081	461,237	863,776
1935..	454,703	523,216	30,796	105,960	38,247	164,807	10,500	85,885	7,618	52,335	541,864	932,203
1936..	729,019	808,294	38,470	123,560	40,191	182,783	12,064	87,076	14,078	77,258	833,822	1,278,971

Table 270.—Production in Canada, Imports and Exports of Gypsum, 1935 and 1936

	1935		1936	
	Quantity	Value	Quantity	Value
	Tons	\$	Tons	\$
SHIPMENTS BY GRADES—				
Crude (1)—Lump or mine run.....	38,403	54,122	47,628	58,954
Crushed.....	437,699	488,186	709,326	794,002
Fine ground.....	369	2,893	738	4,108
Calcined gypsum (2).....	65,393	387,002	76,130	421,907
Total.....	541,864	932,203	833,822	1,278,971
SHIPMENTS BY PROVINCES—				
Nova Scotia.....	454,703	523,216	729,019	808,294
New Brunswick.....	30,796	105,960	38,470	123,560
Ontario.....	38,247	164,807	40,191	182,783
Manitoba.....	10,500	85,885	12,064	87,076
British Columbia.....	7,618	52,335	14,078	77,258
Total.....	541,864	932,203	833,822	1,278,971
Total gypsum mined and quarried (1).....	562,471		841,116	
Total gypsum calcined (2).....	82,569		95,655	
IMPORTS—				
Gypsum, crude (sulphate of lime).....	17	196	4	150
Gypsum, ground, not calcined.....	262	7,846	340	9,548
Plaster of Paris or gypsum, calcined, and prepared wall plaster.....	1,727	27,676	813	19,661
Total.....	2,006	35,718	1,157	29,359
EXPORTS—				
Gypsum or plaster, crude.....	439,341	508,338	650,377	756,010
Plaster of Paris, ground, and prepared wall plaster.....	717	38,074	752	19,280
Total.....	440,058	546,412	651,129	775,290

(1) Includes some anhydrite quarried in Nova Scotia.

(2) Does not include gypsum calcined in manufacturing plants located in Montreal and Calgary.

Table 271.—Consumption of Gypsum in Canadian Cement Industry, 1930-1936

Year	Tons	Year	Tons
1930.....	74,227	1934.....	19,172
1931.....	56,677	1935.....	21,611
1932.....	27,537	1936.....	25,447
1933.....	13,319		

(2) The Gypsum Products Industry

Four companies operating 9 separate factories manufactured gypsum products in Canada during 1936. Their output was valued at \$1,970,822 in 1936 compared with \$1,418,793 in 1935 and was made up of gypsum wallboard, tile, hardwall plaster, acoustical plaster, etc.

The average number of employees in 1936 was 217, to whom \$219,495 were paid in salaries and wages. Capital employed was reported at \$2,766,619. Fuel and electricity cost \$77,415 and the material used in manufacturing processes cost \$798,799.

Table 272.—Principal Statistics of the Gypsum Products Industry, 1936

Number of establishments.....	9
Capital employed.....	\$ 2,766,619
Number of employees.....	217
Salaries and wages.....	\$ 219,495
Cost of fuel and electricity.....	\$ 77,415
Cost of materials at works.....	\$ 798,799
Selling value of products at works.....	\$ 1,970,822

Table 273.—Materials Used in the Gypsum Products Industry, 1935 and 1936

Materials	Unit of Measure	1935		1936	
		Quantity	Cost at works	Quantity	Cost at works
			\$		\$
Crude gypsum.....	short ton	10,000	38,958	17,057	70,011
Plaster of Paris (calcined gypsum).....	short ton	36,533	216,917	72,233	359,755
Hair.....	lb.	93,000	5,326	170,398	14,380
Paper.....	short ton	3,115	152,698	3,952	184,223
Starch or paste.....	lb.	200,500	13,894	324,000	25,934
All other materials.....	x		106,521		63,711
Containers.....	x		47,631		80,785
Total.....	x		581,945		798,799

Table 274.—Output of the Gypsum Products Industry, 1935 and 1936

Products	Unit of measure	1935		1936	
		Quantity	Selling value at works	Quantity	Selling value at works
			\$		\$
Gypsum wallboard.....	sq. ft.	34,042,353	840,808	42,863,567	996,308
Gypsum hard wall plasters.....	short ton	42,165	472,681	57,138	804,973
All other products.....	x		105,304		169,541
Total.....	x		1,418,793		1,970,822

Table 275.—World Production of Gypsum, 1934-1936

(Supplied by *Imperial Institute*)

(Long tons)

Producing country	1934	1935	1936	Producing country	1934	1935	1936
BRITISH EMPIRE				FOREIGN COUNTRIES—Con.			
United Kingdom.....	961,581	981,913	1,002,472	Roumania (b).....	46,430	61,058	(a)
Union of South Africa.....	22,929	21,249	31,457	Spain (c).....	1,042,135	(a)	(a)
Canada.....	440,442	502,206	750,996	Sweden.....	119	167	92
Cyprus (estimated).....	14,000	16,000	13,000	U.S.S.R. (Russia).....	677,662	(a)	(a)
Palestine.....	3,377	4,471	6,111	Algeria.....	80,026	54,476	44,575
India.....	46,757	45,318	54,404	Egypt.....	147,348	187,655	(b)252,164
Australia.....	89,654	118,136	125,584	Tunis (estimated).....	25,000	25,000	25,000
Total.....	1,579,000	1,689,000	1,984,000	Mexico.....	(a)	59,944	60,736
FOREIGN COUNTRIES				United States.....	1,371,580	1,699,893	2,421,884
Austria.....	33,000	38,000	48,000	Argentina.....	43,445	48,987	54,826
Estonia.....	4,828	6,139	13,630	Brazil (estimated).....	2,000	2,000	2,000
France.....	1,430,500	1,255,000	(a)	Chile.....	10,729	25,738	22,200
Germany.....	851,000	952,000	(a)	Peru.....	8,018	8,913	(a)
Greece.....	4,454	4,800	13,561	China.....	66,650	70,000	70,000
Italy (including alabaster).....	451,729	463,726	319,659	Japan.....	125,617	135,503	(a)
Latvia (exports).....	80,524	97,372	121,552	New Caledonia.....	13,400		
Luxembourg.....	10,520	29,008	28,650	Total*.....	6,600,000	6,900,000	(a)
				World's Total*.....	8,200,000	8,600,000	(a)

*Gypsum is also produced in Poland, Switzerland, French Morocco and Cuba.

(a) Information not available.

(b) Converted from cubic metres at the rate of 1 cubic metre=2 long tons.

(c) Including 364,768 cubic metres of gypsum converted as per (b) for 1934.

IRON OXIDES (OCHRE) MINING INDUSTRY

Production (sales) of iron oxides, crude and calcined, in Canada during 1936 totalled 5,854 short tons valued at \$69,630 as compared with 5,516 short tons worth \$77,075 in 1935. Of the 1936 output, 5,458 short tons valued at \$65,630 were produced in Quebec and 396 short tons at \$4,000 in British Columbia. Production during the first six months of 1937 showed a decided gain over the corresponding period of the preceding year, the output of the material totalling 2,735 short tons valued at \$42,580 as against a tonnage of 1,548 worth \$21,395 in the first half of 1936.

Oxides or purifying materials consumed in the Canadian Coke and Gas Industry during 1936 were valued at \$41,291 while iron oxides, including ochres, siennas and umbers, used in the manufacture of paints and pigments totalled 1,367 short tons valued at \$133,669.

Imports into Canada of ochres, ochrey earths, siennas and umbers during 1936 amounted to 1,506 short tons worth \$49,750, while exports of mineral pigments, iron oxides, ochres, etc., in the same period, totalled 1,572 short tons valued at \$92,011. Of the imports, 917 short tons valued at \$28,541 came from the United States, 322 short tons worth \$8,399 from France, and 223 short tons at \$10,368 from the United Kingdom.

Mineral pigments have been produced in Canada for many years. In 1851 an important deposit of ochre was worked in Quebec at Pointe du Lac, St. Maurice county. These pigments, as produced in Canada in 1886 and classified as iron oxides, amounted to 350 tons valued at \$2,350. The annual variation in production has been considerable since that date, the low point for the industry being reached in 1890 when 275 tons were extracted, while the maximum output, 19,128 tons, valued at \$157,909, was attained in 1920. The mineral in the crude condition as shipped by Canadian producers is utilized as a purifying agent in the manufacture of heating or illuminating gas, while the calcined or higher grades are consumed in the paint and pigment industries.

A report issued by the Bureau of Mines, Ottawa, contains the following information—"There are numerous occurrences of ochres and iron oxides in Quebec and Ontario, and some of these might be utilized, should the market demand warrant their development.

"In Nova Scotia there are various beds of ochres and umbers which have been worked in the past to a small extent. In Alberta and British Columbia, there are several known deposits of ochre, some of which have commercial possibilities, but owing to their present inaccessibility and also to the limited market they have had little development. In Northern Manitoba, large deposits of ochre have been reported from the vicinity of Grand Rapids and Cedar Lake. In Saskatchewan there are also several known deposits of ochres and iron oxides that as yet have not been developed commercially."

During 1936 there were six iron oxide properties reported as active in Canada, four in the province of Quebec and two in British Columbia. Capital employed in the industry totalled \$167,499, employees numbered 39 and salaries and wages distributed amounted to \$30,281. The cost of fuel, purchased electricity and process supplies consumed during the year under review was \$11,419 and the net value of sales was computed at \$58,211 compared with a corresponding value of \$64,836 in 1935.

Table 276.—Capital Employed in the Iron Oxides Industry in Canada, 1936

	\$
CAPITAL EMPLOYED AS REPRESENTED BY:	
(a) Present cash value of the land (excluding minerals)	34,876
(b) Present value of buildings, fixtures, machinery, tools and other equipment	80,174
(c) Inventory value of materials on hand, ore in process, fuel and miscellaneous supplies on hand	26,809
(d) Inventory value of finished products on hand	23,640
(e) Operating capital (cash, bills and accounts receivable, prepaid expenses, etc.)	2,000
Total	167,499

Table 277.—Employees, Salaries and Wages in the Iron Oxides Industry in Canada, 1936

Class	Number of employees	Salaries and wages
		\$
Salaried employees	3	3,792
Wage-earners	36	26,489
Total	39	30,281

Table 278.—Wage-Earners Employed, by Months, 1936

Month	Number	Month	Number
January	26	July	51
February	25	August	60
March	25	September	49
April	24	October	44
May	29	November	34
June	38	December	26

Table 279.—Production of Iron Oxides in Canada, 1927-1936

(For the years 1883 to 1926, see Mineral Production of Canada, 1928)

Year	Quantity	Value	Year	Quantity	Value
	Tons	\$		Tons	\$
1927	6,125	103,536	1932	5,240	46,161
1928	5,414	111,198	1933	4,357	53,450
1929	6,518	115,932	1934	4,959	66,166
1930	6,596	83,873	1935	5,516	77,075
1931	5,520	49,205	1936	5,854	69,630

Table 280.—Production in Canada, Imports and Exports of Iron Oxides, 1935 and 1936

	1935		1936	
	Quantity	Value	Quantity	Value
	Tons	\$	Tons	\$
PRODUCTION (SALES) (*)—				
Quebec.....	5,357	75,388	5,458	65,630
British Columbia.....	159	1,687	396	4,000
Total.....	5,516	77,075	5,854	69,630
IMPORTS—				
Ochres, ochrey earths, siennas and umbers.....	1,554	54,661	1,505	49,750
Oxides, fireproofs, rough stuff, fillers and colours, dry, n.o.p.....	3,478	623,698	2,999	721,614
EXPORTS—				
Mineral pigments, iron oxides, ochres, etc.....	1,925	108,032	1,572	92,011

(*) Includes both crude and refined.

Table 281.—Consumption of Iron Oxides in Specified Canadian Industries, 1932-1936

Years	Coke and gas		Paints, pigments and varnishes		Paints, pigments and varnishes	
	Quantity	Value	Quantity	Value	Quantity	Value
	Tons (a)	\$	Tons (b)	\$	Tons (c)	\$
1932.....	3,736	35,284	701	52,323	512	48,037
1933.....	2,734	29,076	504	43,826	491	43,671
1934.....	3,757	47,010	580	53,539	544	53,236
1935.....	3,701	46,204	990	77,758	564	56,219
1936.....	(d)	41,291	733	67,580	634	65,819

(a) Oxide or purifying materials.

(b) Iron oxide pigments.

(c) Ochres, siennas and umbers.

(d) Data not available.

*Prices.—Canadian, September, 1937.—Iron oxides, red, 2 cents to 6½ cents per pound; yellow, 5 cents to 8¾ cents per pound; brown, 6¼ cents per pound; black, 7¼ cents per pound. Siennas, 5 cents to 7½ cents per pound. Umbers, 4¼ cents to 5 cents per pound.

†United States, October, 1937.—Iron oxide per pound: standard (No. 1 quality) Spanish red, 3 to 4 cents; domestic earth, 2½ to 4½ cents. Ochre per ton, f.o.b. Georgia mines: \$19 in sacks; \$22.50 in barrels. Buff clay, 98 per cent through 325 mesh, \$19. F.O.B. Virginia, dark yellow, 300 mesh, 60 per cent ferric oxide, in jute bags, \$19.50.

The following information is taken from a paper submitted to the Canadian Institute of Mining and Metallurgy by Mr. Joseph Bradley of the Sherwin-Williams Company, Red Mill, Quebec:—

“Classification of Iron Oxide Colours.—Some of these iron-oxide minerals are used in the raw (uncalcined) state, in which case all that is required to prepare them for the paint industry is washing, drying, and grinding. Others, especially the hydroxides, are calcined (or “burnt”) in order to destroy any associated organic matter and at the same time to drive off a portion or the whole of the water they contain. As they become dehydrated, the colour of the material changes and the process is regulated to give a product of the tint required. Artificially prepared hydroxides are treated in the same manner. Following is a classification of the more important iron-oxide colours:

UNCALCINED GROUP:

Raw ochre (yellow)
Raw sienna (dull yellow)
Raw umber (greenish-brown)
Persian Gulf red
Spanish red

CALCINED GROUP:

Red ochre
Burnt sienna (reddish-brown)
Burnt umber (dark brown)
Metallic brown
Canadian red oxide

*Canadian Chemistry and Metallurgy, Toronto.

†Engineering and Mining Journal—Metal and Mineral Markets—New York.

"Raw Ochre, Yellow Ochre.—The French yellow ochre, which has world-wide use, is rated the best in this class and has been adopted as the standard of comparison for ochres from other sources. Yellow ochres average about 20 per cent ferric oxide, the balance being combined water, with also silica and alumina.

"Raw Sienna.—This takes its name from the province of Sienna, Italy, the original source of pigments of this type. Deposits of similar nature are found on the isle of Sardinia. The material from both these localities is all exported from the port of Leghorn. There is some production of sienna from deposits in Virginia, but the Italian sienna is still considered to be the standard of quality. Raw sienna usually contains a higher percentage of ferric oxide than the yellow ochres, ranging as high as 75 per cent Fe_2O_3 .

"Raw Umber or Raw Turkey Umber.—This is a product from the isle of Cyprus, but was exported through the port of Constantinople, in Turkey, and received its name thereby. The Cyprus umber is of a warm violet-brown hue. Its composition varies somewhat, but averages ferric oxide 36 per cent, silica 29 per cent, manganese dioxide 12 per cent, with small amounts of calcium carbonate, alumina, and combined water. England, the United States, and France have umber deposits, but not equal to the Cyprus umber in quality.

"Persian Gulf Red.—A hematite ore, red with a crimson shade, found on Ormuz island, in the Persian gulf. It is exported in the crude state in bulk to many countries, where it is milled to a fine paint pigment and used extensively by paint manufacturers. It contains 75 per cent ferric oxide, with about 20 per cent silica.

"Spanish Red.—A soft red hematite ore from the province of Andalusia, Spain, exported through the port of Malaga. It is not quite so bright in shade as the Persian red. It is shipped in large quantities to many countries, both in the crude and in the milled state. Grinding mills for preparing the finished colour are located near Malaga. Analysis of the average material gives 85 per cent ferric oxide with 10 per cent silica.

"Red Ochres.—These are prepared by calcining raw yellow ochre in a hearth or rotary furnace so that some of the combined water is driven off and the characteristic red shades of hematite are developed. The shade of the finished product will depend on the raw ochre used and on the method of calcining.

"Burnt Sienna.—Raw sienna calcined at a moderate heat in a hearth furnace yields a product having a dull red shade, which is known as burnt sienna. Considerable skill is required in the calcining process to obtain the rich transparent undertones desirable in this pigment.

"Metallic Brown.—Produced by calcination of iron carbonate and limonite ores.

"Red Oxides.—These are made by calcining the better grades of limonite ore. Depending on the ore and the conditions of calcination, products of various shades, from a light red to purple, may be made. Some of these carry up to 96 per cent ferric oxide.

"Burnt Umber.—Raw umber is calcined at a comparatively low heat, with proper furnace control, to obtain the characteristic rich brown shades of burnt umber so highly prized by colour men."

THE MICA MINING INDUSTRY

The production of mica in Canada during 1936 totalled 1,601,557 pounds valued at \$74,556. Shipments during the year under review were 27.5 per cent higher in quantity and 9.1 per cent lower in value than those of the preceding year. Tonnage increases over 1935 were realized for knife-trimmed, thumb-trimmed, and scrap grades, whereas decreases were recorded for rough-cobbed and splittings. The average price for rough-cobbed mica showed a distinct increase over 1935, declines, however, occurred in the average prices for knife-trimmed, splittings and thumb-trimmed grades; the average price of scrap mica remained practically unchanged.

Commercial shipments of mica in 1936 were reported only from Ontario and Quebec and of the tonnage sold, 66 per cent came from Ontario properties. The total value of Quebec shipments was considerably higher than that reported for Ontario; this higher valuation resulted from the production in Quebec of a greater quantity of the better grades. In addition to the

commercial production of mica recorded for Quebec and Ontario there was a shipment in 1936 of some thirty tons of fine flake muscovite mica to Vancouver; this was produced at Baker Inlet near Prince Rupert and was destined for grinding.

The value of Canadian mica production has declined greatly during recent years, particularly since 1926 when the value of shipments totalled \$229,204. Canadian mica sales in 1886, the first year for which statistics are available, were valued at \$29,008; from 1898 to 1927, inclusive, the annual output, with the exception of those of 1915 and 1921, exceeded \$100,000 in value. The value of Canadian mica production in 1920 totalled \$376,022, the highest ever recorded in the Dominion.

The value of Canadian mica exports in 1936 totalled \$87,300 compared with \$75,950 in 1935; of the 1936 total the combined exports of rough-cobbed, knife and thumb-trimmed grades comprised 70 per cent or \$61,474 and of these particular grades those shipped to the United Kingdom were appraised at \$52,350 and those to the United States at \$7,659. Exports of scrap and waste in 1936 totalled 2,473,600 pounds valued at \$14,152 against 1,340,000 pounds at \$6,189 in 1935; the entire export in 1936 was to the United States.

The mica mining industry reported twenty-two properties as active during 1936, sixteen of these being located in Quebec and six in Ontario. Capital employed in 1936 amounted to \$221,800 and \$44,550 were distributed as salaries and wages to 101 employees. The gross value of products totalled \$74,556 and the net value was estimated at \$64,732.

The Bureau of Mines, Ottawa, describes the production of sheet mica in Canada "... as almost wholly of the phlogopite or amber mica variety. It is derived almost entirely from adjacent sections of Ontario and Quebec, within an area extending roughly from Kingston, on Lake Ontario, northeastward into Hull and Papineau counties, Quebec.

"The production of muscovite, or white mica, in Canada has been negligible. Small amounts have been recovered occasionally from feldspar mining operations but, in general, the proportion of sound, merchantable sheet mica in Canadian pegmatites has proved too low for profitable mining.

"There was some prospecting and working of both old and new properties in 1936 and toward the end of the year two long-idle mines in the Gatineau River district of Quebec were reopened. In addition there was a small production of muscovite mica from the old Pied des Monts mine, near Murray Bay, Quebec, as well as some prospecting of other muscovite occurrences in the Saguenay region.

"The abundant supply of cheap, skilled native labour, both in India (the main source of muscovite mica) and Madagascar, has reduced the making of all classes of splittings to small proportions on the American continent. The better grades of Canadian amber mica, however, are considered superior in point of heat-resistance to much of the Madagascar product, and the improvement in trimming practice has resulted in a revived interest by the British trade in Canadian supplies of sheet mica for heater purposes."

Vermiculite is a term applied to a group of micaceous minerals that generally are alteration products of mica; connected with the loss of water upon ignition is the common character of exfoliation. Calced vermiculite products include house insulation, acoustic plaster and a variety of other materials. There is no record to date of any commercial production of crude vermiculite in Canada. The mineral is, however, being imported from Montana for processing in Canadian plants.

STANDARDS AND SPECIFICATIONS—UNITED STATES

(National Association of Purchasing Agents, 11 Park Place, New York)

"The specifications on which mica is purchased naturally vary according to its uses. For electrical purposes the dielectric strength, power factor, resistance to heat, and sometimes flexibility are important properties. Specifications for dielectric strength differ widely for different electrical uses and with different consumers, but all mica free from cracks, pinholes, and certain types of staining has such a high dielectric strength that it rarely fails from electric puncture. Some types of staining seem to have little effect on the dielectric strength; in recent tests by the Bureau of Standards the dielectric strength of some stained micas in thickness of 5 mils and over was superior to that of perfectly clear micas. According to these same tests, bubbles in mica do not appear to affect its dielectric strength materially. A good dielectric mica, either stained or unstained, should withstand at least 1,000 volts per mil in thicknesses of 4 to 6 mils when tested with 2-inch plate electrodes.

"Mica for use in electrical condensers should have a low power factor; otherwise it will heat excessively under an electric load. Hence, stained micas or those containing bubbles should not be employed for this purpose. A satisfactory condenser mica should have a power factor of 0.02 per cent or less.

"All good electrical muscovite is sufficiently resistant to heat for ordinary electrical uses and will withstand 500° to 600° C. without appreciable change. Therefore no specification for heat resistance is usually required if the mica is not to be subjected to higher temperatures. A soft, light-colored phlogopite, however, should be specified for use above 600° C., as these grades of phlogopite are more resistant to heat than muscovite. Phlogopite is generally specified for use in commutators because it wears at the same rate as the copper segments, thereby keeping the surface of the commutator smooth.

"Flexibility is sometimes an important property of electrical mica; for example, a flexible mica is required in wrapping the spindles of spark plugs where thin sheets have to be rolled to small diameters. A usual specification for so-called cigarette mica is that a sheet 1 mil thick can be rolled into a cylinder $\frac{1}{4}$ -inch in diameter without cracking.

"Wet-ground mica is employed principally in the wall paper industries where a high luster and ability to mix smoothly with liquid vehicles are required. Wet-grinding under carefully regulated conditions is the only process known for reducing mica to fine sizes without destroying its sheen and slip. Freedom from biotite, heavy staining with clay or iron oxides, and excessive quantities of gritty minerals is a requisite for wet-ground mica for the wall paper trade. Color is also important, as some micas do not produce as white a product as others. If wet-ground mica is intended for the rubber trade color and freedom from dark specks is generally unimportant. Wet-ground mica should have a high metallic luster, should feel slippery and be free from grit, and should mix smoothly with liquid vehicles.

"Dry-ground mica is used chiefly to prevent adhesion between surfaces of asphalt shingles and rolled roofing and to impart wearing qualities and a pleasing finish to these products. For this purpose 10- to 40-mesh size weighing 14 to 20 pounds per cubic foot is usually specified. A light-weight mica is desired by the roofing trade, as it has a greater covering power per unit of weight than a heavier product. However, in an effort to obtain large coverage, the appearance of the articles is sometimes sacrificed, as the flakes of an unusually light mica are so thin that the dark background of the material is too readily seen through them. Consequently they do not produce as bright and pleasing a finish as thicker and heavier flakes. Coarser sizes of dry-ground mica (4- to 10-mesh) are used for Christmas-tree snow and similar decorative purposes, but the consumption of these sizes is comparatively small."

Table 282.—Capital Employed in the Mica Mining Industry in Canada, by Provinces, 1936

	Quebec	Ontario	Canada
	\$	\$	\$
CAPITAL EMPLOYED AS REPRESENTED BY:			
(a) Present cash value of the land (excluding minerals).....	102,560	22,761	125,321
(b) Present value of buildings, fixtures, machinery, tools and other equipment..	7,475	5,349	12,824
(c) Inventory value of materials on hand, ore in process, fuel and miscellaneous supplies on hand.....	43,049	1,885	44,934
(d) Inventory value of finished products on hand.....	225	1,095	1,320
(e) Operating capital (cash, bills and accounts receivable, prepaid expenses, etc.)	32,595	4,806	37,401
Total	185,904	35,896	221,800

Table 283.—Employees, Salaries and Wages in the Mica Mining Industry in Canada, 1936

	Number of employees	Salaries and wages
		\$
Salaried employees.....	3	3,565
Wage-earners.....	98	40,985
Total	101	44,550

Table 284.—Number of Wage-Earners on Payroll or Time Record on 15th of Each Month or Nearest Representative Date, 1935 and 1936

Month	1935		1936	
	Mine	Shop	Mine	Shop
January.....	43	45	54	31
February.....	41	52	56	33
March.....	33	47	65	37
April.....	44	39	56	27
May.....	74	28	71	29
June.....	68	43	75	33
July.....	70	48	65	35
August.....	69	20	63	26
September.....	57	22	60	25
October.....	50	22	65	24
November.....	36	27	59	34
December.....	37	22	62	27

Table 285.—Production of Mica in Canada, by Provinces, 1927-1936

(For the years 1886 to 1926, see Mineral Production of Canada, 1928)

Year	Quebec		Ontario		Canada	
	Quantity	Value	Quantity	Value	Quantity	Value
	Tons	\$	Tons	\$	Tons	\$
1927.....	1,454	99,194	1,284	75,183	2,738	174,377
1928.....	1,101	54,224	2,559	32,944	3,660	87,168
1929.....	1,062	72,630	2,991	45,919	4,053	118,549
1930.....	430	61,729	740	34,275	1,170	96,004
1931.....	290	30,601	1,049	23,465	1,339	54,066
1932.....	41	4,076	268	2,752	309	6,828
1933*.....	256	39,060	666	9,371	944	49,284
1934*.....	322	85,967	618	9,059	998	97,071
1935.....	373	74,894	255	7,144	628	82,038
1936.....	272	63,123	529	11,433	801	74,556

*Total for Canada includes 22 tons valued at \$853 produced in British Columbia in 1933 and 58 tons valued at \$2,045 in 1934.

Table 286.—Production of Mica in Canada, by Grades, 1935 and 1936

	1935			1936 (a)		
	Quantity	Value, f.o.b. shipping point	Price per pound	Quantity	Value, f.o.b. shipping point	Price per pound
	Pounds	\$	\$	Pounds	\$	\$
Rough cobbled.....	30,605	2,448	0-08	10,940	2,615	0-24
Knife-trimmed.....	111,459	52,959	0-48	113,169	48,086	0-42
Thumb-trimmed.....	12,013	3,616	0-30	35,289	3,233	0-09
Splittings.....	32,921	15,506	0-47	24,376	9,780	0-40
Scrap.....	1,068,618	7,509	0-007	1,417,783	10,842	0-008
Total.....	1,255,616	82,038		1,601,557	74,556	

(a) Fine flake muscovite was reported shipped in 1936 but no statistics are available

Table 287.—Imports and Exports of Mica, 1935 and 1936

	1935		1936	
	Quantity	Value	Quantity	Value
	Pounds	\$	Pounds	\$
IMPORTS—				
Mica and manufactures of, n.o.p.—				
From—United Kingdom.....		13,041		15,491
United States.....		46,765		45,790
British India.....		4,620		12,412
Germany.....		2,375		3,761
Other countries.....				368
Total.....		66,801		77,822
Chalk, China, Cornwall or cliff stone and mica schist.....		20,229		32,253
EXPORTS—				
Mica, rough, cobbled, knife-trimmed and thumb-trimmed—				
To—United Kingdom.....	105,500	44,904	103,200	52,350
United States.....	42,200	6,571	61,200	7,659
Other countries.....	1,900	721	3,900	1,465
Mica, scrap and waste—				
To—United States.....	1,339,500	6,186	2,473,600	14,152
United Kingdom.....	500	3		
Mica splittings—				
To—United Kingdom.....	800	308	5,100	1,415
United States.....	33,800	16,307	21,800	8,916
Mica plate and manufactures of (micanite).....		950		1,343
Total.....		75,950		87,300

Table 288.—Exports of Mica from India, 1935-1936

		1935	1936
In blocks.....	Cwt.	23,774	27,235
Splittings.....	Rupees	4,334,680	4,572,240
	Cwt.	118,040	150,429
	Rupees	3,700,001	4,604,271
Total of Mica—			
To—United Kingdom.....	Cwt.	37,448	43,049
	Rupees	3,836,105	4,360,558
Germany.....	Cwt.	12,813	19,053
	Rupees	618,839	787,952
France.....	Cwt.	3,713	7,743
	Rupees	386,253	374,845
United States.....	Cwt.	69,397	93,080
	Rupees	1,994,942	2,790,668
Other countries.....	Cwt.	18,443	14,739
	Rupees	1,198,542	862,488
Total.....	Cwt.	141,814	177,664
	Rupees	8,034,681	9,176,511
Value of rupee in Canadian funds.....		37.17 cents	37.55 cents

Table 289.—Madagascar System of Grading Mica for Size (1935)

(Source—National Association of Purchasing Agents, New York City)

Series	Grade	Size of rectangle, square inches
1	00.....	Over 48
1	0.....	36 to 48
1	1.....	24 to 36
2	2.....	15 to 24
2	3.....	10 to 15
3	4.....	6 to 10
3	5.....	3 to 6
3	6.....	1 to 3
4	All splittings.....	
4	Smaller sheet than grade 6.....	
4	Scrap and ground mica.....	

Table 290.—Exports of Mica from Madagascar, by Destination, 1935 and 1936

(Source—United States Department of the Interior)

Country	1935		1936	
	Metric tons	Value francs	Metric tons	Value francs
France.....	175	1,956,000	90	1,267,000
England.....	67	641,000	207	1,865,000
United States.....	156	1,327,000	148	1,273,000
Germany.....	10	92,000	7	64,000
Others.....	1	3,000		
Total.....	409	4,019,000	452	4,469,000

NOTE.—1 metric ton=1.102 short tons.

Table 291.—Consumption of Mica in Canada by Industries, as Reported to the Annual Census of Industry, 1935-1936

	1935		1936	
	Quantity	Cost at works	Quantity	Cost at works
	Tons	\$	Tons	\$
In Electrical Apparatus Industry.....	37	58,016	54	77,336
In Rubber Industry.....	62	6,297	61	5,358
In Roofing Industry.....	100	3,594	90	2,522
In Mica Manufacturing Industry.....	9	7,018	8	7,790
In Paints Industry.....	6	2,089	1	45
In Coal Tar Distillation Industry.....	42	1,702	29	945
In Iron Foundry Industry (mica schist).....	332	2,701	182	1,945
Total accounted for.....	588	81,417	425	95,941

Table 292.—World Production of Mica, 1934-1936

(Imperial Institute, London)

(Long tons)

Producing country	1934	1935	1936	Producing country	1934	1935	1936
BRITISH EMPIRE				FOREIGN COUNTRIES			
Northern Rhodesia.....	1	2	3	Italy.....	5	(a)	(a)
Southern Rhodesia.....	2	4	10	Norway (exports).....	167	56	43
Tanganyika Territory—				Roumania.....		(c)	81
Sheet.....	9	25	10	Sweden.....	16	31	123
Waste.....	22	21	23	U.S.S.R. (Russia).....	4,363	8,143	(a)
Union of South Africa (b)...	273	573	488	Madagascar—			
Canada—				Muscovite.....	(1,543 lb.)	(1,917 lb.)	
Knife trimmed.....	27	50	50	Phlogopite, etc.....	289	513	404
Thumb trimmed.....	41	5	16	United States (sales)—			
Splittings.....	33	15	11	Sheets (uncut).....	261	418	589
Rough cobbled.....	1	14	5	Scrap.....	6,892	16,832	18,710
Scrap.....	789	477	633	Argentina.....	172	221	(a)
Ceylon (exports).....	20	2		Bolivia (exports).....	4	2	(a)
India (exports)—				Brazil (exports).....	58	108	233
Sheet.....	1,031	1,189	1,362	Korea.....	101	86	(a)
Splittings.....	3,615	5,902	7,521				
Australia.....	120	44	21				

(a) Information not available.

(b) Nearly all scrap.

(c) 10 cubic metres.

The following amounts of lithia mica were produced:—

	1934	1935	1936
South West Africa.....	231	489	852 long tons
France.....	500	350	(a)
Portugal.....	294	8	
United States (lithium minerals).....	642	1,030	1,106 long tons
Argentina.....			60 long tons

THE SALT INDUSTRY

The quantity of salt produced in Canada during 1936 totalled 391,316 short tons valued at \$1,773,144 as compared with 360,343 short tons worth \$1,880,978 in 1935. The tonnage produced in 1936 was the greatest ever recorded for the Canadian salt industry and increases over 1935 on the quantity shipped were realized for each particular grade. In 1936 salt was produced in Nova Scotia, Ontario and Manitoba, with the tonnage originating in Ontario comprising 89.5 per cent of the total Dominion output. Salt consumed in the manufacture of chemicals during 1936 totalled 165,882 short tons or approximately 42 per cent of the entire Canadian salt production.

The chemical industry is the largest single consumer of salt in Canada, there being 386,228,680 pounds of salt utilized during 1936 by manufacturers of acids, alkalies and salts; in the same year the slaughtering and meat packing industry used 70,680,249 pounds, and 53,532,600 pounds were employed in the canning and curing of fish. Relatively large quantities of the mineral were also consumed in the manufacture of soaps, in the dyeing and finishing of textiles, in pulp and paper mills, in tanneries, and in the making of biscuits, confectionery, sausages, malt products, etc.

Imports of salt into Canada in 1936 totalled 108,923 short tons valued at \$460,998. Of this quantity, 31,967 tons were classified as salt for use of sea or gulf fisheries. Exports of salt from the Dominion in 1936 amounted to 5,549 short tons appraised at \$46,601 and of this quantity 3,475 short tons were consigned to the United States, 738 tons to Newfoundland, and 882 tons to New Zealand. Imports of potash and potassium compounds in 1936 totalled 4,568,919 pounds valued at \$352,635; soda and sodium compounds, 87,841,053 pounds worth \$2,327,268; liquid chlorine, 6,296,562 pounds valued at \$133,570, and crude iodine, 65,318 pounds at \$61,357. Bromine salts imported into Canada in 1936 totalled only 845 pounds worth \$623.

The number of firms active in the production of salt in 1936 was eight; capital employed by these totalled \$3,856,187 and \$640,644 was disbursed as salaries and wages to 506 employees; of the wage-earners, 347 were recorded as male and 37 as female. The industry expended \$181,502 for fuel and electricity, \$31,195 for process supplies, and \$527,647 for packages or containers.

Salt production in Nova Scotia is confined to the output of the Malagash rock salt mine located on the Malagash Peninsula, Cumberland county. During the year under review underground work was mainly conducted on Nos. 13 and 15 levels above which the white salt was stoped by overhand methods, using a longwall undercutter; one of these machines also began stoping operations towards the end of the year on No. 24 level. The brine for the evaporator was still obtained from No. 4 level.

In Ontario, Manitoba and Saskatchewan, salt is obtained from brine wells. Production in Ontario comes entirely from the southern part of the province where in 1936 brines were processed by the Dominion Salt Co. Limited, Goderich Salt Co. Limited, Walker Salt Corp. Limited, Warwick Pure Salt Co., Western Canada Flour Mills Co. Limited, Canadian Industries Limited, and Brunner, Mond Canada, Limited.

Caustic soda, chlorine and hydrochloric acid are now manufactured by Canadian Industries Limited at its new plant located at Cornwall, Ontario. Salt consumed in this plant is obtained from the company's wells at Sandwich. The Brunner, Mond Canada, Limited, located at Amherstburg, Ontario, manufacture soda ash from brine; calcium chloride is also recovered as a by-product by this company.

At Neepawa in Manitoba, operations were conducted steadily throughout 1936 by Neepawa Salt Limited, and the successful drilling of an additional brine well was reported. No salt production has been recorded for Saskatchewan since 1935 in which year shipments of the mineral were made by the Simpson Oil Co. Limited. A well was drilled during 1936 at Waterways, Alberta, by Industrial Minerals Limited and almost 200 feet of pure salt was reported as being encountered at 694 feet from the surface; a plant for the production of salt from brine by direct-fired pans is being erected by this company.

In the Maritime Provinces extensive beds of salt are known to occur near Gautreau, New Brunswick, and near Amherst, in Cumberland county, Nova Scotia. It is also interesting to note that potassium chloride occurs in a number of definite bands in the salt deposit at Malagash, Nova Scotia.

The following information relating to the utilization of salt in highway construction is taken from a report issued by the Bureau of Mines, Ottawa: "Experiments have been carried on with encouraging results in Nova Scotia and elsewhere for the past few years to determine the effect of a mixture of salt with clay as a surface veneer and in the foundations of gravel highways, in order to decrease, if not entirely eliminate, the dust nuisance and heavy maintenance cost of such roads, and to form a hard wearing surface. This matter is now being studied seriously not only by the salt producers in Canada, but by several of the provincial departments of highways, and during 1936 a number of stretches of road in Ontario were treated in this manner. The stretches of road in Ontario treated by salt stabilization in 1935 have now been under traffic for over a year, including one winter season, and the results have been sufficiently encouraging to warrant further tests. Another interesting use is the mixing of salt with the sand piles placed at the side of the main highways in Ontario in order to keep the sand free-flowing for distributing on icy roads."

Table 293.—Capital Employed in the Salt Industry in Canada, 1936

	\$
Capital employed as represented by—	
(a) Present cash value of the land (excluding minerals).....	813,633
(b) Present value of buildings, fixtures, machinery, tools and other equipment.....	2,243,108
(c) Inventory value of materials on hand, ore in process, fuel and miscellaneous supplies on hand.....	203,651
(d) Inventory value of finished products on hand.....	127,862
(e) Operating capital (cash, bills and accounts receivable, prepaid expenses, etc.).....	467,933
Total.....	3,856,187

Table 294.—Employees, Salaries and Wages in the Salt Industry in Canada, 1936

	Number of employees		Total	Salaries and wages
	Male	Female		
				\$
Salaried employees.....	82	40	122	225,170
Wage-earners.....	347	37	384	415,474
Total.....	429	77	506	640,644

Table 295.—Number of Wage-Earners on Pay Roll in the Salt Industry on the 15th of each month, 1936

Month	Male	Female	Total
January.....	307	33	340
February.....	268	33	301
March.....	334	28	362
April.....	346	33	379
May.....	347	33	380
June.....	358	38	396
July.....	369	44	413
August.....	368	45	413
September.....	375	43	418
October.....	380	43	423
November.....	383	44	427
December.....	325	31	356

DOMINION BUREAU OF STATISTICS

Table 296.—Production of Salt in Canada, by Grades, 1935 and 1936

Grade	1935			1936		
	Manu- factured	Sold	Value of salt sold*	Manu- factured	Sold	Value of salt sold*
	Tons	Tons	\$	Tons	Tons	\$
Table, dairy and pressed blocks.....	72,210	73,704	990,222	77,428	76,567	867,215
Common, fine.....	84,748	82,608	422,724	81,646	83,095	358,776
Common, coarse.....	23,057	22,014	181,543	27,477	28,162	218,176
Land salt.....	289	261	962	1,061	1,046	3,780
Other grades.....	32,488	36,323	140,094	38,364	36,564	159,315
Brine for chemical works (salt equivalent sold or used).....	145,433	145,433	145,433	165,882	165,882	165,882
Total	358,225	360,343	1,880,978	391,858	391,316	1,773,144
Value of containers.....			492,050			527,647
Grand total	358,225	360,343	2,373,028	391,858	391,316	2,300,791

*Not including containers.

Table 297.—Production of Salt by Provinces (*), 1927-1936

Year	Nova Scotia		Ontario		Manitoba		Saskatchewan	
	Tons	Value	Tons	Value	Tons	Value	Tons	Value
		\$		\$		\$		\$
1927.....	14,391	102,590	254,181	1,510,777				
1928.....	19,604	118,342	279,841	1,377,629				
1929.....	27,819	157,662	302,445	1,420,424				
1930.....	23,058	136,226	248,637	1,558,405				
1931.....	27,718	143,761	231,329	1,760,388				
1932.....	31,897	150,708	231,138	1,789,751	508	7,092		
1933.....	34,278	161,889	244,107	1,755,087	1,499	18,388	231	4,510
1934.....	42,886	191,917	276,751	1,734,196	1,664	20,137	452	8,703
1935.....	38,701	161,659	320,003	1,698,508	1,538	18,765	101	2,046
1936.....	38,774	183,915	350,044	1,557,078	2,498	32,151		

(*) In addition Alberta produced 100 tons in 1927 valued at \$1,200.

Table 298.—Production in Canada, Imports, Exports and Consumption of Salt, 1935-1936

	1935		1936	
	Tons	Value	Tons	Value
		\$		\$
PRODUCTION	360,343	1,880,978	391,316	1,773,144
IMPORTS —				
Salt, for the use of the sea or gulf fisheries.....	50,942	147,611	31,967	99,214
Salt, in bulk, n.o.p.....	46,610	193,447	43,129	148,404
Salt, n.o.p., in bags, barrels, etc.....	30,628	193,520	33,784	212,423
Salt, table, made by an admixture of other ingredients, when containing not less than 90 per cent of pure salt.....	67	2,162	42	957
Total	128,247	526,740	108,922	460,998
EXPORTS	9,045	51,239	5,549	46,601
APPARENT CONSUMPTION OF SALT	479,545	2,356,479	494,689	2,187,541

Table 299.—Available Statistics on Consumption of Salt, in Specified Canadian Industries, 1935 and 1936

Industries	1935		1936	
	Quantity used	Cost at works	Quantity used	Cost at works
	Pounds	\$	Pounds	\$
Fish canning and curing (factories only).....	42,786,700	212,554	53,532,600	256,651
Slaughtering and meat packing.....	59,027,400	364,331	70,680,249	398,025
Acids, alkalies and salts—Brine (salt content) and dry salt.....	342,782,000	286,358	386,228,680	318,824
Soaps.....	5,695,451	25,588	5,480,103	36,474
Dyeing, cleaning and laundry work.....	4,177,216	31,791	3,723,761	32,333
Dyeing and finishing of textiles.....	2,327,718	10,322	1,331,421	8,694
Artificial ice.....	1,963,710	8,541	1,984,906	8,559
Abrasives—artificial.....	514,000	2,212	674,000	2,671
Waterworks.....	1,100,000	.....	*1,100,000	.....
Leather tanneries.....	8,813,300	45,946	11,356,421	42,462
Pulp and paper mills.....	19,510,000	77,932	11,100,000	57,655
Woollen textiles.....	.....	6,499	.....	6,936
Stock and poultry foods.....	2,384,000	18,831	2,744,000	21,200
Bread and other bakery products.....	12,406,240	130,370	13,796,760	131,811
Fruit and vegetable preparations.....	6,461,954	48,121	8,747,050	56,257
Biscuits, confectionery, etc.....	1,246,840	13,924	1,538,040	14,187
Food, breakfast.....	1,384,929	10,176	1,621,266	11,518
Sausage and sausage casings.....	1,734,325	11,545	1,606,404	9,753
Ice cream industry.....	.....	12,133	.....	11,275
Breweries.....	321,805	2,599	278,393	2,194
Malt and malt products.....	274,766	1,765	249,975	1,534
Coffee, tea and spices.....	161,286	1,842	162,993	2,007
Macaroni, vermicelli, etc.....	53,471	547	49,671	504
Ice cream cones.....	3,420	28	2,079	17
Food, miscellaneous.....	614,004	8,174	782,936	7,421

*Estimated.

Table 300.—World Production of Salt, 1934-1936

(Imperial Institute)

(Long tons)

Producing country and description	1934	1935	1936
BRITISH EMPIRE			
United Kingdom—			
Rock-salt.....	20,848	19,539	20,416
Brine-salt.....	2,499,025	2,680,553	2,812,400
Malta.....	2,200	2,000	1,900
Mauritius (estimated)—			
Sea-salt.....	1,500	1,500	1,500
Nigeria (estimated).....	400	400	400
Somaliland (exports)—			
Sea-salt.....	3,161	2,613	1,485
South West Africa.....	2,756	4,942	3,762
Anglo-Egyptian Sudan.....	24,035	26,115	26,600
Kenya.....	(a)	3,750	(a)
Tanganyika Territory.....	7,301	6,807	8,439
Uganda.....	4,872	1,565	3,351
Union of South Africa (b).....	81,918	85,883	(a)
Canada.....	289,319	319,844	349,873
British West Indies (exports)—			
Sea-salt—			
Bahamas.....	3,125	536	.....
Turks and Caicos Islands.....	18,663	28,348	41,237
Ceylon.....	62,448	40,955	39,696
Cyprus (estimated).....	3,000	3,000	3,000
India (including Aden)—			
Rock-salt.....	179,171	178,352	172,255
Other salt.....	1,784,531	1,769,821	1,563,633
Palestine—			
Rock-salt.....	837	853	743
Sea-salt.....	9,241	10,212	7,931
Australia—			
Victoria (b).....	46,074	47,592	(a)
Western Australia.....	2,670	(a)	4,227
South Australia.....	61,083	78,003	66,326
Total*.....	5,100,000	5,300,000	5,200,000
Foreign countries—Total. *.....	24,000,000	26,000,000	27,000,000
World's total.....	29,000,000	31,000,000	32,000,000

(a) Information not available.

(b) Years ended June 30.

*Salt is also produced in many countries for which statistics are not available, e.g., Gold Coast, Bolivia, etc.

TALC AND SOAPSTONE INDUSTRY

Production in Canada of talc and soapstone, both crude and refined, totalled \$177,270 in 1936 compared with a value of \$171,532 in 1935. Soapstone production during 1936 came entirely from the Eastern Townships in Quebec and was valued at \$32,770. Talc production in 1936 totalled 14,508 short tons worth \$144,500. The mineral was produced chiefly in the Madoc district, Hastings county, Ontario; in British Columbia a relatively small tonnage was shipped from a property operated at Anderson Lake in the Lillooet mining district. The western production of talc was utilized principally in the manufacture of roofing materials. Ontario talc is of high quality and was shipped almost wholly in the refined state, various grades being marketed in the Dominion and foreign countries. It is employed chiefly in the cosmetic, rubber, paper, textile, and roofing industries. Soapstone, produced in Quebec, was shipped in both the crude and dressed state and was consigned principally to the pulp and paper industry.

Shipments of talc and soapstones ranging from 50 tons to 1,420 tons were made from Canadian deposits during the period 1886 to 1906. Prior to 1900 the production consisted mainly of impure talc and soapstone shipped from Quebec.

It was not until 1900 that mining operations were commenced on the high grade talc deposits of the Madoc district. Ground talc was shipped from this district in 1906. Production advanced in value during the ensuing years until in 1927 the all-time high record output of \$236,105 was attained for these minerals.

Although it is known that early settlers made use of soapstone from deposits in Quebec for lining fireplaces and ovens and for footwarmers, the first official records of the mining of soapstone are for 1871 when 300 tons valued at \$1,000 were shipped from a deposit in Bolton township, Brome county.

The talc of the Madoc area is of foliated type, has a good white colour, and occurs as a series of vertical veins or bands in white crystalline dolomite. Near Broughton, in Quebec, crude, lump talc, from a band cutting the soapstone body, and soapstone waste are shipped to a Montreal grinding plant. In addition to its use as a furnace material, Quebec soapstone is utilized in the manufacture of stoves, mantels, interior trim, ornaments, crayons, etc. The Bureau of Mines, Ottawa, reports that a recent development which may seriously affect the demand for soapstone for pulp-mill use is the introduction of a new type of water cooled alkali-recovery furnace; this is of steel construction, only the base being built of soapstone blocks.

Imports of talc and soapstone during 1936 totalled 2,936 short tons valued at \$43,185 and of these, 2,548 tons valued at \$32,063 came from the United States and 275 tons worth \$7,731 from Italy. Exports of talc during 1936 amounted to 10,222 short tons valued at \$102,071 compared with 8,927 short tons at \$90,823 in 1935.

The number of firms reported as being active in the industry during 1936 totalled 7 of which 3 were located in Quebec, 3 in Ontario and 1 in British Columbia. Capital employed during 1936 amounted to \$647,929 and \$70,935 were distributed as salaries and wages to 85 employees. The cost of fuel and purchased electricity used in 1936 was \$21,669 and the value of explosives and various other process supplies consumed totalled \$11,723. The net value of sales was estimated at \$143,878 compared with \$134,121 in 1935.

The Canadian price for domestic crude talc in 1936 approximated \$6 per short ton while prices per short ton for the milled product ranged from \$9 to \$17.50, depending upon the grade and quality. Crude soapstone ranged in price from \$1.50 to \$2.00 per short tons; dressed soapstone ranged up to approximately \$28 per short ton depending on grade and specifications.

Table 391.—Capital Employed in the Talc and Soapstone Industry in Canada, 1936

	\$
CAPITAL EMPLOYED AS REPRESENTED BY—	
(a) Present cash value of the land (excluding minerals).....	7,744
(b) Present value of buildings, fixtures, machinery, tools and other equipment.....	553,899
(c) Inventory value of materials on hand, ore in process, fuel and miscellaneous supplies on hand.....	7,042
(d) Inventory value of finished products on hand.....	7,741
(e) Operating capital (cash, bills and accounts receivable, prepaid expenses, etc.).....	71,503
Total	647,929

Table 302.—Employees, Salaries and Wages in the Talc and Soapstone Industry in Canada, 1936

	Number of employees		Total	Salaries and wages
	Male	Female		
Salaried employees.....	13	2	15	\$ 26,526
Wage-earners.....	70	.....	70	44,409
Total.....	83	2	85	70,935

Table 303.—Wage-Earners, by Months, 1935-1936

Month	1935	1936
January.....	102	53
February.....	100	61
March.....	71	54
April.....	89	72
May.....	88	77
June.....	84	63
July.....	87	79
August.....	70	83
September.....	71	84
October.....	62	79
November.....	77	70
December.....	82	61

Table 304.—Production of Talc and Soapstone in Canada, 1927-1936

(For the years 1888 to 1926, see Mineral Production of Canada, 1928)

Year	Value	Year	Value
	\$		\$
1927.....	236,105	1932.....	159,038
1928.....	219,358	1933.....	190,836
1929.....	229,198	1934.....	180,777
1930.....	186,216	1935.....	171,532
1931.....	157,083	1936.....	177,270

Table 305.—Production (Sales) in Canada, Imports and Exports of Talc and Soapstone, 1935 and 1936

	1935		1936	
	Quantity	Value	Quantity	Value
	Tons	\$	Tons	\$
PRODUCTION—				
Soapstone (Quebec).....		32,053		32,770
Talc—Ontario.....	13,710	138,161	14,461	143,701
British Columbia.....	93	1,318	47	799
Total Canada.....		171,532		177,270
IMPORTS—				
Talc or soapstone, ground or unground—				
From—United Kingdom.....	0.25	18	0.50	40
United States.....	2,214	29,431	2,548	32,063
Italy and other countries.....	480	15,054	387	11,082
Total imports.....	2,694	44,503	2,936	43,185
EXPORTS—				
Talc—				
To—United Kingdom.....	930	9,660	1,368	12,957
United States.....	7,947	80,504	8,742	87,907
Other countries.....	50	659	112	1,207
Total exports.....	8,927	90,823	10,222	102,071

Table 306.—Consumption of Talc in Canada, by Industries, as Reported to the Annual Census of Manufactures, 1935 and 1936

Industries	1935		1936	
	Tons	Cost at works	Tons	Cost at works
		\$		\$
Electrical Apparatus.....	186	4,297	191	4,946
Paints.....	1,811	45,654	1,948	47,378
Soaps and cleaning preparations.....	139	2,583	128	2,680
Toilet preparations.....	504	29,250	397	22,393
Medicinals and pharmaceuticals.....	103	6,269	147	8,508
Polishes.....	1	32	10	222
Prepared roofing.....	1,363	16,034	1,839	21,500
Pulp and paper.....	1,361	24,652	1,124	22,497
Total accounted for.....	5,448	128,771	5,784	130,124

Table 307.—World Production of Talc, 1934-1936

(Imperial Institute)

(Long tons)

Producing country	1934	1935	1936	Producing country	1934	1935	1936
BRITISH EMPIRE				FOREIGN COUNTRIES— Concluded			
Union of South Africa.....	215	299	406	Italy.....	37,042	41,014	43,226
Canada (sales) (c).....	12,463	12,324	12,954	Norway.....	27,285	27,343	25,827
India.....	9,375	12,596	9,968	Roumania.....	1,902	1,967	2,489
Australia.....	1,739	1,442	1,502	Spain (b).....	10,750	(a)	(a)
FOREIGN COUNTRIES				Sweden.....	6,398	5,967	7,033
Austria.....	30,188	30,254	30,000	Egypt.....	2,562	360	345
Bulgaria.....	15	15	.....	Morocco (French) (exports)	776	709	1,346
Finland.....	1,561	2,150	(a)	United States (sales).....	123,665	154,211	193,028
France.....	67,800	58,600	(a)	Argentina.....	42	173	174
Germany (Bavaria).....	6,824	3,900	5,009	Uruguay (exports).....	2,595	1,181	704
Greece.....	116	543	850	China.....	3,000	(a)	(a)
				French Indo-China.....	.....	.....	670
				"Manchoukuo".....	64,000	70,000	(a)

Talc is also produced in U.S.S.R. (Russia).

(a) Information not available.

(b) In addition 2,590 cubic yards were quarried during 1934.

(c) Excluding soapstone, which is only recorded by value and was as follows:—

1934.....	£8,900
1935.....	£6,500
1936.....	£6,600

MISCELLANEOUS NON-METAL MINING INDUSTRIES

Included in this chapter are the following non-metallic minerals:—

Actinolite	Lithium minerals	Phosphate
Barytes	Magnesitic dolomite	Pyrites and Sulphur
Bituminous sands	Magnesium sulphate	Silica brick
Fluorspar	Manganese, bog	Sodium carbonate
Graphite	Mineral waters	Sodium sulphate

Canadian operators producing certain industrial minerals and who are usually relatively few in number have been segregated for statistical purposes into a single group designated as the Miscellaneous Non-Metal Mining Industry. Minerals or primary mineral products produced by this industry during 1936 included: fluorspar, graphite, magnesitic-dolomite (crude and refined), magnesium sulphate, mineral waters, phosphate, silica brick, sodium carbonate and sodium sulphate. For convenience, the sulphur content of pyrites shipped, sulphur recovered from smelter gas, and peat are recorded with the various miscellaneous minerals listed above; the value of sulphur production, however, is not included in the total for the miscellaneous non-metallic or industrial minerals as the value of this element is credited to the copper-gold-silver mining and non-ferrous smelting industries.

The total value of production by the industry under review amounted to \$1,554,628 in 1936 as compared with \$1,040,732 in 1935. Increases in the value of shipments above those made in

the preceding year were realized for all products with the exception of sodium carbonate; production of fluorspar was identical in both years and no shipments of bituminous sands were recorded for 1936.

Table 308.—Capital Employed in the Miscellaneous Non-Metal Mining Industries in Canada, 1936

	\$
CAPITAL EMPLOYED AS REPRESENTED BY:—	
(a) Present cash value of the land (excluding minerals).....	101,175
(b) Present value of buildings, fixtures, machinery, tools and other equipment.....	1,483,036
(c) Inventory value of materials on hand, ore in process, fuel and miscellaneous supplies on hand.....	136,080
(d) Inventory value of finished products on hand.....	169,727
(e) Operating capital (cash, bills and accounts receivable, prepaid expenses, etc.).....	305,603
Total.....	2,195,621

Table 309.—Employees, Salaries and Wages in the Miscellaneous Non-Metal Mining Industries, 1936

	Number of employees			Salaries and wages
	Male	Female	Total	
				\$
Salaried employees.....	62	14	76	106,761
Wage-earners.....	401		401	419,487
Total.....	463	14	477	526,248

Table 310.—Wage-Earners. by Months, 1936

Month	Number
January.....	214
February.....	219
March.....	165
April.....	379
May.....	404
June.....	473
July.....	509
August.....	429
September.....	533
October.....	507
November.....	481
December.....	452
Average.....	401

Table 311.—Production of Miscellaneous Non-Metallic Minerals in Canada, 1935 and 1936

Item	Unit of measure	1935		1936	
		Quantity	Value	Quantity	Value
			\$		\$
Bituminous sands.....	ton	40	160		
Fluorspar.....	ton	75	900	75	900
Graphite.....	\$		79,781		88,812
Magnetitic-dolomite.....	\$		486,084		768,742
Magnesium sulphate.....	ton	340	7,965	654	13,712
Mineral waters.....	imp. gal.	146,516	16,590	154,286	18,516
Peat.....	ton	1,340	5,761	1,341	7,376
Phosphate (a).....	ton	186	1,103	525	4,927
Silica brick.....	M	2,461	96,194	2,393	97,285
Sodium carbonate.....	ton	242	2,430	192	1,677
Sodium sulphate.....	ton	44,817	343,764	75,598	552,681
Total (Gross).....	\$		1,040,732		1,554,628
Sulphur production (*).....	ton	67,446	634,235	122,132	1,033,055

(a) Represents apatite mined in Quebec and Ontario.

(*) Includes sulphur content of pyrites at its sales value and estimated figures for quantity and value of sulphur in smelter gases used for acid making or recovered as elemental sulphur, or in ammonium sulphate (direct).

ACTINOLITE

Commercial production of actinolite (CaMgFe) in Canada has originated entirely in the townships of Elzevir and Kaladar in Hastings and Addington counties of Ontario. No shipments of the mineral were reported since 1934, when 30 tons valued at \$365 were produced near Kaladar, Ontario; the output in 1934 was marketed in the ground state and contained a relatively high percentage of added mica flake. Actinolite is employed chiefly in the manufacture of roofing materials.

Table 312.—Production of Actinolite in Canada, 1927-1936

(For production from 1897 to 1925, see Mineral Production of Canada, 1928)

Year	Tons	Value	Year	Tons	Value
		\$			\$
1927.....	86	1,075	1932.....		
1928.....	70	875	1933.....		
1929.....	30	375	1934.....	30	365
1930.....	34	437	1935.....		
1931.....	35	456	1936.....		

BARYTES

Barite production in Canada during past years came largely from deposits in Nova Scotia, Quebec and Ontario and in recent years more particularly from deposits in the Lake Ainslie district, Nova Scotia. The last commercial shipments from Canadian deposits were made in 1933 in which year 20 tons valued at \$60 were produced and shipped at the Tionaga mine, Penhorwood township, Ontario. A modern mill was installed a few years ago at a deposit in Langmuir township, Ontario; this property, however, was closed down without coming into commercial production. Near Spillimacheen in British Columbia barite replaces limestone in thickness from 10 to 60 feet and the possibility of producing commercial barite as a by-product here from the milling of lead ore has been suggested.

During 1936 crude barite, both domestic and foreign, used in the United States totalled 303,449 short tons of which 83,990 tons were utilized in the manufacture of ground barite, 167,014 tons for lithopone and 52,445 tons for barium chemicals. In the United States the quoted prices for ground barite, \$23 per short ton, f.o.b. St. Louis, has not changed for several years; crude ore, minimum 95 per cent BaSO₄, less than 1 per cent iron, ranged from \$5.50 to \$7 per ton in 1936.

Imports of barite into Canada during 1936 totalled 33,160 cwt., valued at \$26,554 compared with 42,784 cwt. worth \$33,739 in 1935. Of the 1936 imports, 19,791 cwt. came from Germany, 8,823 cwt., from the United Kingdom, and 4,534 cwt., from the United States.

Table 313.—Production of Barytes in Canada, 1927-1936

(For the years 1885 to 1926, see Mineral Production of Canada, 1928)

Year	Tons	Value	Year	Tons	Value
		\$			\$
1927.....	56	1,268	1932.....		
1928.....	127	2,847	1933.....	20	60
1929.....	105	2,341	1934.....		
1930.....	66	1,484	1935.....		
1931.....	16	363	1936.....		

Table 314.—Imports of Blanc Fixé, Lithopone and Barytes into Canada, 1932-1936

Year	Lithopone		Barytes		Blanc Fixé	
	Tons	Value	Pounds	Value	Pounds	Value
		\$		\$		\$
1932.....	8,055	585,148	2,583,400	22,989	932,168	20,932
1933.....	5,694	406,598	3,174,700	28,255	552,801	11,390
1934.....	7,265	510,558	3,113,800	26,397	968,201	21,638
1935.....	8,692	620,615	4,278,400	33,739	1,139,106	25,759
1936.....	9,429	666,667	3,316,000	26,554	1,064,032	21,480

Table 315.—Barytes and Blanc Fixé Used by the Canadian Paints, Pigments and Varnishes Industry in Canada, 1932-1936

Year	Barytes		Blanc Fixé*	
	Quantity	Value	Quantity	Value
	Pounds	\$	Pounds	\$
1932.....	2,064,303	35,138	23,353	817
1933.....	2,062,957	33,578	47,793	1,471
1934.....	2,393,330	44,690	93,918	2,481
1935.....	2,308,628	43,702	141,975	4,223
1936.....	2,533,275	41,687	97,016	3,148

*Artificial barium sulphate.

Table 316.—World Production of Barium Minerals, 1934-1936

(Imperial Institute, London)

(Long tons)

Producing country and description	1934	1935	1936	Producing country and description	1934	1935	1936
BRITISH EMPIRE				FOREIGN COUNTRIES—Con.			
United Kingdom—				Germany—Con.			
Barytes, unground.....	37,719	41,881	37,250	Prussia.....	321,164	321,786	385,910
Witherite, unground.....	10,412	9,409	8,751	Saxony.....	476	218	460
Barytes—				Thuringia.....	(a)	545	443
Ground, bleached.....	5,548	6,288	5,731	Wurtemberg.....	(a)	(a)	1,000
Ground, unbleached....	20,315	20,554	21,338	Greece.....	7,729	22,726	30,841
Southern Rhodesia.....	13			Italy.....	31,896	40,502	36,092
India.....	3,813	5,493	5,114	Norway.....			402
Australia.....	2,492	2,544	2,157	Portugal.....			10
FOREIGN COUNTRIES				Spain (b).....	16,586	(a)	(a)
				U.S.S.R. (Russia)—			
Austria.....	1,009	784	1,637	Barytes.....	73,600	(a)	(a)
Czechoslovakia.....	2,061	(a)	(a)	Witherite.....	800		(a)
France.....	17,850	16,600	(a)	Egypt.....	49	84	30
Germany—				United States.....	159,251	194,710	244,698
Baden.....	19,370	12,248	17,519	China.....	9,350	(a)	(a)
Bavaria.....	8,253	6,961	10,999	French Indo-China.....			39
				Japan.....			3,776
				Korea.....	5,841	10,853	5,032

(a) Information not available.

(b) In addition 147 cubic metres were produced in quarries during 1934.

BITUMINOUS SANDS

Commercial production of bituminous sands in Canada is confined to the province of Alberta. Large deposits of the material occur along the Athabaska river in the northern part of the province. Output during 1935 totalled 40 tons valued at \$160; no production of the material was reported in 1936 but two companies, The Abasand Oils Ltd., and the International Bitumen Company, Ltd., have been actively engaged in development work and, as a result, it was anticipated that commercial production of liquid and solid hydrocarbons from the bituminous sand would commence in 1937.

Table 317.—Production of Bituminous Sands in Canada, 1927-1936*

Year	Tons	Value	Year	Tons	Value
		\$			\$
1927.....	2,706	10,824	1932.....	343	1,372
1928.....	94	374	1933.....	466	1,662
1929.....	989	3,956	1934.....	862	3,449
1930.....	2,067	8,268	1935.....	40	160
1931.....	1,015	4,060	1936.....		

*Production came entirely from the province of Alberta.

FLUORSPAR

Canadian mine shipments of fluor spar during both 1936 and 1935 totalled 75 tons valued at \$900. Output in these years came entirely from deposits located in the Madoc area, Hastings county, Ontario. Fluorspar has also been produced at the Rock Candy Mine, in British Columbia, by the Consolidated Mining and Smelting Company of Canada, Limited; this property, however, has not been in production since 1929 in which year shipments totalling 17,800 short tons valued at \$267,000 were made from this mine. Very few important deposits of fluor spar are known in Canada and by far the greater supply of the mineral for the ceramic and metallurgical industries is imported.

Fluorspar prices in the United States (October, 1937) as published by "Metal and Mineral Markets", New York, were—per net ton, 85 per cent CaF_2 , and not over 5 per cent SiO_2 , Kentucky and Illinois, in bulk, f.o.b. mines, washed gravel, \$20 for all rail movement. No. 2 lump, \$21, f.o.b. mines. Ground fluor spar, f.o.b. Illinois mines, 95 to 98 per cent CaF and not over $2\frac{1}{2}$ per cent SiO_2 , \$35 in bulk. F.O.B. Colorado mines, 82-6, \$12.80 to \$13. Foreign fluor spar, gravel, 85-5, \$24.00 per gross ton, duty paid, Baltimore or Philadelphia.

Table 318.—Production of Fluorspar in Canada, by Provinces, 1926-1936

(For the years 1905 to 1925, see Mineral Production of Canada, 1928)

	Ontario		British Columbia		Canada	
	Quantity	Value	Quantity	Value	Quantity	Value
	Tons	\$	Tons	\$	Tons	\$
1926-1928.....						
1929.....	70	1,120	17,800	267,000	17,870	268,120
1930.....	80	1,240			80	1,240
1931.....	40	620			40	620
1932.....	32	464			32	464
1933.....	73	1,064			73	1,064
1934.....	150	2,100			150	2,100
1935.....	75	900			75	900
1936.....	75	900			75	900

Table 319.—Fluorspar Shipped from Mines in the United States, by Uses, 1936

(United States Bureau of Mines)

Industry	Short tons	Average value per ton
		\$
Steel.....	141,618	16.22
Foundry.....	2,326	15.79
Glass.....	11,014	24.27
Enamel and vitrolite.....	5,249	24.62
Hydrofluoric acid and derivatives.....	12,627	25.82
Miscellaneous.....	3,157	16.19

Table 320.—Consumption of Fluorspar in Canada, by Uses, as Reported to the Annual Census of Industry

Industries	1935		1936	
	Quantity	Cost at works	Quantity	Cost at works
	Tons	\$	Tons	\$
Steel foundries.....	5,859	73,047	7,942	88,403
Chemicals (acids, alkalis and salts).....	2,695	34,347	3,502	46,402
Glass.....	98	3,357	71	2,360
Ferro-alloys.....	134	230	10	174
Enamelling and glazing.....	106	(a)	160	(a)
Total accounted for.....	8,892		11,685	

(a) Not available.

Table 321.—World Production of Fluorspar, 1934-1936

(Imperial Institute, London)

(Long tons)

Producing country	1934	1935	1936
BRITISH EMPIRE			
United Kingdom.....	34,216	31,146	32,962
Union of South Africa.....	1,371	1,949	3,074
Canada.....	134	67	67
Australia.....	1,737	685	816
Newfoundland (c).....	2,400	2,930	5,214
FOREIGN COUNTRIES			
France.....	13,900	22,400	(a)
Germany—			
Anhalt.....	7,241	7,941	11,048
Baden.....	6,424	3,879	7,242
Bavaria.....	29,193	30,783	48,377
Prussia.....	21,215	24,229	35,698
Saxony.....	6,424	6,828	7,864
Thuringia.....	(a)	23,200	18,495
Italy.....	9,515	8,291	11,256
Norway.....	662	1,050	997
Spain (b).....	5,400	(a)	(a)
U.S.S.R. (Russia).....	26,600	48,300	(a)
Mexico (estimated).....	1,000	1,000	1,000
United States.....	78,000	91,000	150,000
Argentina.....	306	397	443
China.....	5,000	(a)	(a)
Korea.....	11,908	9,568	8,602

(a) Information not available.

(b) In addition, 270 cubic metres were produced from quarries during 1934.

(c) Exports for years ended June 30.

GRAPHITE

Canadian mine production of graphite during 1936 was valued at \$88,812 compared with \$79,781 in 1935. The output in 1936 came solely from the Black Donald mine, Renfrew county, Ontario. Relatively small and intermittent shipments of graphite were also made from Quebec properties prior to 1935.

The Bureau of Mines, Ottawa, described the Black Donald deposit as of exceptional size and richness, and while the graphite flakes are too small to be suitable for crucible use, the products made are well adapted for lubricants and foundry facings. In recent years, the highest grade has been successfully employed in pencil manufacture, being exported to the United States and there reduced to the requisite degree of fineness. All other graphite mines and mills established at various times in Ontario and Quebec have been inactive for many years and the plants have, in most cases, been dismantled.

According to the United States Bureau of Mines the graphite mining industry in the United States remained virtually dormant in 1936. The largest world producers of amorphous graphite include Germany, Austria, Czechoslovakia, Mexico and Chosen, while flake and vein graphite came chiefly from Madagascar and Ceylon, respectively.

"Canadian Chemistry and Metallurgy", Toronto, quotations for graphite, October, 1937, was—various grades, 100 pound lots, per pound, 15 cents to 40 cents. "Metal and Mineral Markets", New York, October, 1937, quotations for graphite were—per pound, f.o.b. New York: Ceylon lump, 7 to 7½ cents; carbon lump, 6 to 7 cents; chip, 5 to 6 cents; dust, 3 to 4 cents; Madagascar flake, 6 to 7½ cents. No. 1 flake, 9½ to 17 cents; No. 2, 17 cents upwards. Crude amorphous graphite, f.o.b. New York, \$12 to \$23 per ton, according to grade.

Table 322.—Production of Graphite in Canada, by Provinces, 1927-1936

(For production from 1886 to 1926, see Mineral Production of Canada, 1928)

Year	Quebec		Ontario		Canada	
	Quantity	Value	Quantity	Value	Quantity	Value
	Tons	\$	Tons	\$	Tons	\$
1927.....	34	2,043	1,795	109,613	1,829	111,656
1928.....	50	4,668	1,047	52,373	1,097	57,041
1929.....	173	12,652	1,288	90,522	1,461	103,174
1930.....	197	9,850	1,338	86,542	1,535	96,392
1931.....			548	32,149	548	32,149
1932.....			346	18,483	346	18,483
1933.....	43	2,222	362	16,145	405	18,367
1934.....	129	6,426	1,389	64,998	1,518	71,424
1935.....	21	1,281	1,761	78,500	1,782	79,781
1936.....				88,812		88,812

Table 323.—Production in Canada, Imports and Exports of Graphite, 1934-1936

	1934		1935		1936	
	Quantity	Value	Quantity	Value	Quantity	Value
	Tons	\$	Tons	\$	Tons	\$
Production.....	1,518	71,424	1,782	79,781		88,812
IMPORTS—						
Crucibles, plumbago.....		36,363		38,066		38,559
Plumbago, not ground or otherwise manufactured.....		2,989		6,559		5,166
Plumbago, ground, and manufactures of, n.o.p.....		103,652		92,852		88,188
EXPORTS—						
Graphite or plumbago, crude or refined....	1,935	90,129	3,548	145,772	3,384	138,454
Carbon and graphite electrodes.....		564,432		488,188		657,361

Table 324.—Consumption of Graphite or Plumbago in Canada, by Industries, as Reported in the Census of Industry, 1935 and 1936

Industries	1935		1936	
	Quantity	Cost at works	Quantity	Cost at works
	Tons	\$	Tons	\$
Paints and varnishes.....	64	5,293	59	5,023
Polishes.....	57	6,679	55	5,796
Foundries.....	156	16,179	127	18,004
Acids and salts.....	38	11,834	35	11,132
Prepared foundry facings.....	121	5,740	156	6,746
Total accounted for.....	436	45,725	432	46,701

Table 325.—World Production of Graphite, 1934-1936

(Imperial Institute, London)

(Long tons)

Producing country	1934	1935	1936
BRITISH EMPIRE			
Union of South Africa.....	62	65	58
Canada (sales).....	1,355	1,591	(b)
Ceylon (exports).....	11,569	13,908	13,515
India.....	337	557	388
Australia.....	5	44	23
FOREIGN COUNTRIES			
Austria (crude).....	17,858	19,182	21,367
Czechoslovakia.....	3,448	1,840	2,880
Germany (crude).....	17,258	21,321	23,906
Italy.....	3,846	5,072	5,118
Norway.....	2,245	2,305	2,338
Sweden.....		68	62
U.S.S.R. (Russia).....	45,000	82,400	(a)
Madagascar.....	8,343	9,621	7,280
Morocco (French).....			400
Mexico.....	3,827	6,866	10,092
Japan.....	954	1,182	1,551
Korea—			
Flake.....	2,394	4,167	5,757
Other.....	28,406	39,368	34,511

NOTE.—Graphite is also produced in the United States.

(a) Information not available.

(b) Recorded by value only (£17,859).

LITHIUM ORE

During 1936 the Lithium Corporation of Canada, Ltd., conducted considerable diamond drilling on a lithium bearing deposit located at Bernie Lake, near Pointe du Bois, Manitoba. The first recorded commercial shipments of lithium ores in Canada were made from this property in 1937 when, during the first six months of the year, shipments valued at \$1,202 were made to the United States for the manufacture of chemicals. Lithiated waters and medicinal preparations still account for a relatively large part of the consumption of lithium; there is a growing use of lithium chloride in air-conditioning and the uses of the metal are not unimportant. The United States Bureau of Mines reported that, although amblygonite was still quoted nominally at \$34 to \$35 per short ton, f.o.b. South Dakota mines, actual sales were made at prices up to \$40 a ton for 8 to 9 per cent material. The price of spodumene was about \$20 f.o.b. South Dakota mines. (See also under Metals.)

MAGNESITIC DOLOMITE

Production in Canada of magnesitic-dolomite (calcined) during 1936 was valued at \$768,742 compared with \$486,084 in 1935. The pronounced improvement experienced in this industry in 1936 continued into 1937 with production during the first six months totalling \$340,907 against \$295,177 in the first half of 1936.

Magnesitic-dolomite production in Canada, as an industry, is confined to Grenville and Harrington townships, Argenteuil county, Quebec. Deposits of the rock were discovered here in 1900 but it was not until 1907 that these were developed. The cutting off of the Austrian supply of magnesite during the world war greatly stimulated investigations of the Ottawa Valley deposits as a Canadian source of magnesite for the manufacture of refractory brick and furnace lining.

The annual output of the material in Canada, since 1923, has surpassed \$100,000 in value; production reached \$491,170 in 1929, later declining, during the depression, to \$262,860 in 1932. Recovery since that year has been consistently steady up to the all-time high record of \$768,742 for the year under review.

The Bureau of Mines, Ottawa, reports that deposits of earthy hydromagnesite occur in British Columbia near Atlin and Clinton, and large deposits of magnesite containing considerable amounts of silica and alumina occur between Cranbrook and Kimberley. These latter have been acquired by the Consolidated Mining and Smelting Company and some development has been done as well as experimental work designed to remove the aluminium silicates; there has been no commercial production from these deposits to date.

Continued progress is being made in the development of new refractory products from the magnesitic-dolomite deposits of Quebec and, according to the Bureau of Mines, one of the newest developments is the production of chemically bonded unburned bricks and shapes, which have proved satisfactory for the lining of cement kilns and metallurgical furnaces; certain of these materials are particularly adapted for use in the roofs of metallurgical furnaces; new cements and refractory basic plastics have also been developed, and uses have been extended for many of the other products made from magnesitic-dolomite.

"Sales of both foreign and domestic magnesite in the United States increased sharply in 1936 owing to increased steel-making activity. Apparently several times as much caustic-calcined magnesite is now used in the United States as a chemical accelerator in rubber as is used in oxychloride cements. Although the quantity of these cements used in stucco has decreased, the quantity employed in flooring and wallboard has increased. Caustic calcined magnesite is also used as a base for magnesium salts and for heat-insulating materials."—(United States Bureau of Mines, Minerals Yearbook.)

Table 326.—Production of Magnesite* in Canada, 1927-1936

(For the years 1908 to 1926, see Mineral Production of Canada, 1928).

Year	Quantity Tons	Value \$	Year	Quantity Tons	Value \$
1927.....	7,337	230,309	1932.....	†	262,860
1928.....	13,195	346,990	1933.....	†	380,128
1929.....	18,809	461,170	1934.....	†	382,927
1930.....	13,336	336,162	1935.....	†	486,084
1931.....	11,411	295,579	1936.....	†	768,742

*Magnesitic dolomite.

†Owing to the limited number of firms, the data relating to quantity are not published.

Table 327.—Production in Canada, Imports and Exports of Magnesite,* 1934-1936

	1934		1935		1936	
	Quantity	Value	Quantity	Value	Quantity	Value
	Tons	\$	Tons	\$	Tons	\$
PRODUCTION—Calcined and dead-burned....	(d)	382,927	(d)	486,084	(d)	768,742
IMPORTS—						
Magnesia pipe covering.....		45,759		37,523		33,451
Magnesite (crude rock).....	(cwt. 4)	35	(cwt. 1)	20	20	1,271
Magnesite firebrick.....		396,915		384,141		568,565
Magnesite, dead-burned, sintered, caustic-calcined or plastic magnesite.....	472	26,740	765	42,644	1,163	56,515
EXPORTS—						
Magnesite, calcined or dead-burned.....	1,997	56,670	1,577	43,338	2,928	71,183

*Including magnesitic dolomite.

(d) Not available for publication.

Imports of magnesite (magnesium oxide) in 1936 totalled 372,692 pounds valued at \$40,182 compared with 275,265 pounds valued at \$28,304 in 1935 and 390,001 pounds at \$34,462 in 1934.

Table 328.—Magnesite and Dolomite used in the Manufacture of Artificial Abrasives, Abrasive Products and Iron and Steel and their Products in Canada, 1931-1936

Year	Abrasives		Iron and steel			
	Magnesite*		Dolomite		Magnesite	
	Short tons	Value	Short tons	Value	Short tons	Value
		\$		\$		\$
1931.....	(a)	(a)	15,773	76,317	(a)	(a)
1932.....	(a)	(a)	6,725	32,523	420	14,500
1933.....	(a)	16,430	6,874	30,557	399	14,798
1934.....	104	6,370	14,748	69,104	2,733	105,072
1935.....	40	2,448	18,394	79,914	3,891	149,987
1936.....	418	25,256	43,562	145,502	6,432	230,656

(a) Information not available.

NOTE.—In addition to dolomite and magnesite the Canadian steel industry consumes large quantities of firebrick.

*Calcined.

Table 329.—World Production of Magnesite, 1934-1936

(Imperial Institute, London)

(Long tons)

Producing country and description	1934	1935	1936	Producing country and description	1934	1935	1936
BRITISH EMPIRE				FOREIGN COUNTRIES—Con.			
Union of South Africa—				Italy—			
Crude.....	1,714	1,462	1,667	Crude.....	1,083	1,231	3,105
Canada—				Calcined (c).....		653	
Crude.....	26,953	26,684	(d)	Germany (Prussia)—			
India—				Crude.....	10,836	13,600	14,789
Crude.....	14,975	16,984	15,468	Norway—			
Australia—				Crude.....	2,461	2,486	3,067
Crude.....	15,923	16,068	17,615	Calcined (c).....	659	603	544
FOREIGN COUNTRIES				Bricks (c).....	660	787	607
Austria—				U.S.S.R. (Russia)—			
Crude (b).....	254,301	295,569	391,494	Crude.....	474,000	(a)	(a)
Caustic (c).....	26,736	43,042	57,621	Yugoslavia (Serbia only)—			
Dead-burnt (c).....	64,010	93,029	97,025	Crude.....	24,690	29,286	38,392
Bricks (c).....	28,328	38,172	42,015	Calcined.....	9,611	11,475	13,910
Czechoslovakia—				United States—			
Crude (b).....	8,698	9,317	8,545	Crude.....	90,154	158,173	184,928
Calcined (b).....	23,151	28,763	34,957	Caustic (sales) (c).....	3,670	5,401	7,141
Greece—				Dead-burnt (sales) (c)...	37,458	64,677	80,338
Crude.....	69,276	92,085	114,272	Korea—			
Caustic (c).....	13,943	18,807	22,762	Crude.....	3,118	2,372	14,033
Dead-burnt (c).....	5,888	6,162	6,552	"Manchoukuo"—			
				Crude.....	71,000	154,000	203,000
				Turkey—			
				Crude.....	618	1,075	2,247

(a) Information not available.

(b) Exports.

(c) Derived from crude shown, and not additional.

(d) Production recorded by value only (£154,583).

MAGNESIUM SULPHATE (EPSOM SALTS—NATURAL)

Production of natural magnesium sulphate in Canada during 1936 totalled 654 short tons valued at \$13,712 compared with 340 short tons at \$7,965 in 1935. The output of the mineral in Canada represents recovery of hydrous magnesium sulphate from brine lakes located in British Columbia. Epsom Refineries, Ltd., the sole producers of this mineral in Canada, conducted mining operations from August to September while its refining plant, located at Ashcroft, was active from February to April and from July to the close of the year. The rated capacity of the Ashcroft refinery in 1936 was one ton of finished salts per hour.

Magnesium sulphate is used largely in the tanning and medicinal industries. Discussing magnesium salts generally, the United States Bureau of Mines states that improved technique for handling magnesium precipitates, especially from dilute solutions, has made possible the commercial recovery not only of technical carbonate but of refractories and other moderately low priced magnesia products from natural brines and bitters and even from raw ocean water; as a result, the potential improvement of natural magnesium salts has increased enormously.

Canadian trade publications quoted (October, 1937) magnesium sulphate, B.P. barrels, 2½ to 3 cents per pound. Technical bags, \$36 to \$40 per ton.

Table 330.—Production of Natural Magnesium Sulphate in Canada*, 1933-1936

Year	Tons	Value
		\$
1933.....	120	3,360
1934.....	42	1,100
1935.....	340	7,965
1936.....	654	13,712

*Produced entirely in British Columbia.

Table 331.—Magnesium Sulphate Used in Canadian Pharmaceutical Preparations and Tanning, 1932-1936

Year	Pharmaceutical preparations		Tanning*	
	Pounds	Value	Pounds	Value
		\$		\$
1932.....	622,459	28,073	181,811	2,418
1933.....	851,355	24,629	396,424	4,467
1934.....	816,830	33,793	228,281	4,789
1935.....	826,082	22,647	759,744	12,254
1936.....	878,120	23,162	1,115,965	15,120

*Data not entirely complete for years prior to 1935.

MANGANESE BOG

Bog manganese consists mainly of oxide of manganese and water with usually some oxide of iron and often silica, alumina and baryta. Shipments of bog manganese from Dawson Settlement, Albert county, New Brunswick, during 1931 amounted to 77 tons valued at \$462. Some development work in 1934 was reported on a bog manganese deposit located at North Renous, New Brunswick. No commercial shipments of bog manganese have been made since 1931. The mineral is utilized chiefly in the ceramic industry.

MINERAL WATERS

Shipments of natural mineral waters from Canadian springs totalled 154,286 imperial gallons valued at \$18,516 in 1936 compared with 146,516 imperial gallons worth \$16,590 in the preceding year. Production during both years originated in Ontario and Quebec. Some of the more prominent Canadian mineral waters possessing special therapeutic or hygienic properties include the following: in Quebec the Abenakis springs on the St. François river in Yamaska county; Potton springs in Brome county and the Coulombia spring at L'Epiphanie. In Ontario, saline, sulphur and gas springs occur at Caledonia Springs and at Carlsbad Springs near Ottawa; the waters range from alkaline to strongly saline. St. Catharines, near Niagara, is one of the oldest Canadian mineral water resorts and sulphur waters are found at the Preston mineral springs in Waterloo county. The most famous of all Canadian springs is undoubtedly the group of hot sulphur springs at Banff, Alberta. In British Columbia the Harrison Hot springs, in the Fraser Valley and the Halcyon Hot springs on Arrow Lake are noted for their curative properties.

The total number of firms reporting production of natural mineral waters in the Dominion totalled 16 in 1936, of which 14 were located in the province of Quebec and 2 in Ontario.

It is interesting to note that natural mineral waters from springs in the county of Lac St. Jean, Quebec, were utilized during 1936 in highway maintenance.

Table 332.—Production of Mineral Waters in Canada, 1927-1936

(For the years 1888 to 1926, see Mineral Production of Canada, 1928)

Year	Quantity	Value	Year	Quantity	Value
	Imperial gal.	\$		Imperial gal.	\$
1927.....	303,530	14,624	1932.....	76,714	7,170
1928.....	269,045	33,498	1933.....	38,818	5,441
1929.....	321,905	16,139	1934.....	97,410	17,738
1930.....	227,141	24,481	1935.....	146,516	16,590
1931.....	217,408	13,234	1936.....	154,286	18,516

Table 333.—Production in Canada, Imports and Exports of Mineral Waters, 1934-1936

	1934		1935		1936	
	Quantity	Value	Quantity	Value	Quantity	Value
	Imp. gal.	\$	Imp. gal.	\$	Imp. gal.	\$
Production by provinces—						
Quebec.....	75,665	16,116	126,616	15,113	131,186	17,399
Ontario.....	21,775	1,622	19,900	1,477	23,100	1,117
Total.....	97,440	17,738	146,516	16,590	154,286	18,516
IMPORTS—Mineral and aerated waters.....		87,618		85,040		89,505
EXPORTS—Mineral and aerated waters.....		5,322		4,627		4,057

PHOSPHATE

Shipments of Canadian mined phosphate during 1936 totalled 525 tons valued at \$4,927 compared with 186 tons worth \$1,103 in 1935. Production in 1936 represented apatite recovered chiefly as a by-product mineral in the mining or dressing of mica in the province of Quebec. No production of phosphate rock has been reported in British Columbia during recent years.

The only important recorded occurrences of phosphate rock in Canada are the Precambrian apatite deposits of the Ottawa-Kingston region, in Ontario and Quebec, and the rather low-grade sedimentary phosphate of the Crowsnest district just west of the boundary between southern Alberta and British Columbia.

Phosphate rock is consumed largely in the production of superphosphate (for fertilizer), while the apatite mined in Eastern Canada is utilized in the manufacture of phosphorus. Phosphorus-bearing basic slag, a by-product in the manufacture of basic steel from phosphatic iron ores, is also largely employed as a fertilizer, particularly in England, Germany, Belgium, France and Luxemburg.

"Metal and Mineral Markets", New York, October, 1937, phosphate quotations, were—per long ton, f.o.b. mines: Florida pebble for export, 77 to 76 per cent, \$7.25; 68 per cent, \$4.50. Tennessee, ground lime phosphate, 85 per cent, through 300 mesh, 34-30 per cent P_2O_5 , \$8.25 per short ton, bags extra.

Table 334.—Production of Phosphate in Canada, by Provinces, 1929-1936

Year	Quebec		Ontario		British Columbia		Canada	
	Quantity	Value	Quantity	Value	Quantity	Value	Quantity	Value
	Tons	\$	Tons	\$	Tons	\$	Tons	\$
1929.....	40	800			1,145	4,580	1,185	5,380
1930.....	40	760					40	760
1931.....								
1932.....	1,316	12,333					1,316	12,333
1933.....	105	805			2,109	4,670	2,214	5,475
1934.....	81	683					81	683
1935.....	116	1,043	70	60			186	1,103
1936.....	525	4,927					525	4,927

Table 335.—Imports of Phosphate and Phosphate Products, 1934-1936

	1934		1935		1936	
	Quantity	Value	Quantity	Value	Quantity	Value
	Tons	\$	Tons	\$	Tons	\$
IMPORTS—						
Phosphate rock.....	31,775	165,240	63,514	234,580	83,474	298,179
Acid phosphate (not medicinal).....	1,257	172,279	397	55,449	219	28,462
Phosphorus and compounds, n.o.p.....	115	29,474	55	36,549	35	22,762
Superphosphate or acid phosphate of lime.....	79,286	775,578	75,250	661,792	96,067	867,666
Soda phosphate.....	3,986	195,751	1,870	124,325	1,082	77,961

Table 336.—Phosphate Rock and Superphosphate Used in the Manufacture of Canadian Fertilizers, 1931-1936

Years	Superphosphate		Phosphate rock	
	Short tons	\$	Short tons	\$
1931.....	51,639	595,789	48,373	395,547
1932.....	36,005	366,462	41,114	316,518
1933.....	59,443	657,123	21,961	164,614
1934.....	73,182	839,980	48,007	396,133
1935.....	86,701	986,674	74,507	610,118
1936.....	97,515	1,103,222	60,924	438,948

Table 337.—World Production of Phosphate Rock, 1934-1936

(Imperial Institute, London)

(Long tons)

Producing country	1934	1935	1936	Estimated Tribasic Phosphate of Lime content or equivalent		
				1934	1935	1936
BRITISH EMPIRE						
Tanganyika.....	205	191		(a)	(a)	
Seychelles (exports).....	11,871	9,923	23,564	(a)	(a)	
Union of South Africa.....	76					
Canada.....	72	166	469	46	138	390
India.....	59	102		48	83	
Christmas Island.....	128,010	147,929	155,075	110,300	127,500	133,600
Australia.....	207	235	175	112	127	95
Nauru Island.....	418,950	480,950	547,400	356,600	409,300	465,900
Ocean Island.....	211,250	228,100	403,100	187,200	202,100	357,100
Total.....	771,000	868,000	1,130,000			
FOREIGN COUNTRIES						
Belgium (b).....	14,158	15,531	15,836	4,300	(a)	(a)
Estonia.....	10,442	11,458	11,228	4,563	5,007	4,907
France.....	65,700	49,300	(a)	42,700	32,000	(a)
Germany.....	723	177	1,043	400	100	570
Poland.....	7,534	11,457	12,300	3,292	5,007	5,400
Roumania (e).....	1,200	2,740	(a)	(a)	(a)	(a)
Spain.....	18,992	(a)	(a)	12,154	(a)	(a)
U.S.S.R. (Russia) (d).....	1,172,700	1,800,000	2,178,900	783,500	1,200,000	1,455,700
Algeria.....	523,804	594,326	523,000	350,000	397,000	349,000
Egypt.....	431,016	466,411	522,644	289,000	317,000	355,000
Madagascar.....	8,208	6,000	5,200	6,150	4,500	3,900
Morocco (French).....	1,180,992	1,134,117	1,314,087	898,000	860,000	1,010,000
Tunis.....	1,738,000	1,470,000	1,472,000	1,060,000	890,000	880,000
Netherlands West Indies (exports).....	99,038	89,276	79,831	84,200	76,000	68,000
United States.....	2,898,238	3,159,328	3,462,837	2,087,000	2,274,000	2,493,000
French Indo-China.....	(c) 4,000	(b) 5,795	9,200	3,000	4,350	6,900
China (estimated).....	8,000	8,000	8,000	6,500	6,500	6,500
Japan.....	55,600	89,807	111,315	45,600	73,600	91,300
Netherlands East Indies.....	4,934	11,371	11,881	3,100	6,800	7,500
Angaur Island (exports).....	63,783	76,878	87,817	51,000	61,500	70,200
French Oceania.....	80,700	133,800	145,000	67,100	112,000	120,000
New Caledonia.....	2,000	9,000	2,200	1,500	6,750	1,500
Total.....	8,400,000	9,400,000	10,200,000			
World's total.....	9,200,000	10,300,000	11,300,000			

(a) Information not available.

(b) In addition phosphatic chalk was produced as follows:—

1934.....37,808 long tons
 1935.....63,580 "

(c) Amount ground.

(d) Figures refer to concentrates of apatite and phosphate rock plus the ground phosphate used directly as a fertilizer. The production of phosphate rock before concentration was:—

1934 1935
 Apatite.....1,118,300 1,530,700
 Other phosphate rock.....1,130,400 1,722,700

(e) Converted from cubic metres at the rate of 1 cubic metre=2 long tons.

POTASH

Natural potash salts are not yet mined or recovered on a commercial scale in Canada. Potash occurs in small quantities in rock salt strata at Malagash, Cumberland county, Nova Scotia, and at Gautreau, Westmorland county, New Brunswick. A search for beds of economic importance has been made and results so far obtained have been sufficiently promising to warrant future work. Potassium chloride so far opened up at Malagash occurs in a number of definite bands in the salt mass in the form of crystalline beds of pink and yellowish green sylvite in the matrix of halite. Small shipments of potash-bearing salt have been made from the Malagash deposit; this salt was employed as a fertilizer.

The principal potash producing countries are Germany, France, United States, Russia, Spain, Korea, Poland and Palestine.

Imports into Canada of crude muriate of potash, as a fertilizer, totalled 594,252 cwt., valued at \$583,155 during 1936, while those of crude sulphate of potash, for the same purpose, amounted to 72,717 cwt., valued at \$104,238. The total value of saltpetre and all other potassium compounds imported in 1936 was \$352,635.

Table 338.—Potash Salts Used in the Manufacture of Canadian Fertilizers, 1935 and 1936

	1935		1936	
	Tons	Cost at works	Tons	Cost at works
		\$		\$
Kainite and potash manure salts.....	3,322	28,689	833	9,569
Muriate of potash.....	16,054	378,239	17,251	442,249
Sulphate of potash.....	1,829	63,163	2,551	88,854

Table 339.—Sales of Potash Salts for Fertilizer Purposes, Other than for Manufacture of Mixed Fertilizers, Years ended June 30, 1935 and 1936

	1935	1936
	Tons	Tons
Muriate of potash.....	8,772	7,619
Sulphate of potash.....	521	492

PYRITES (Sulphur)

The sulphur content of pyrites shipped and sulphur recovered from non-ferrous smelter gas (SO₂) amounted in 1936 to 122,132 short tons valued at \$1,033,055 compared with 67,446 short tons worth \$634,235 in 1935. Production in both years came from the provinces of Quebec, Ontario and British Columbia. The production figures for 1936 represent an all-time high record in the output of sulphur by the Canadian mining and smelting industries.

No iron pyrites deposits, known as such, have been mined in Canada for some years and statistics published regarding recent pyrites production refer to by-product iron pyrites recovered in the mining and concentrating of copper-gold-silver ores.

Sulphur employed in the manufacture of sulphuric acid during 1936 was recovered from salvaged smelter gas in Ontario and British Columbia. In Ontario, Canadian Industries Limited continued the operation of its acid plant at Copper Cliff, using sulphur dioxide obtained from the smelter of the International Nickel Company, while in British Columbia the Consolidated Mining and Smelting Company of Canada, Limited, manufactured sulphuric acid at Trail, using the by-product gases of its metallurgical plants; the 1936 annual report of the company states—"The fertilizer plant has been undergoing several changes to combine the operation of the direct production units with the new sulphur dioxide absorption and recovery plants; most of the new plants were started late in the summer. The performance of the commercial sulphur dioxide recovery plants fulfilled the prediction made from the pilot plant. Up to 165 tons per day of excellent grade ammonium sulphate have been recovered at a cost slightly above the cost of that made directly from ammonia and sulphuric acid. The extra cost is due to the extra evaporation required. A remarkably pure elemental sulphur is also obtained from these plants."

"All the gases from the zinc plant will now be treated, the sulphur from the fumes being recovered as ammonium sulphate, sulphuric acid and elemental sulphur—the last two being interchangeable. When the absorption plant proved successful, an appropriation was made to build further absorption plants to treat the tail gas from the sulphuric acid plant and to start recovery of the low grade roaster gas from the lead plant."

At Eustis, Quebec, the Consolidated Copper and Sulphur Co. Limited produced and shipped iron pyrites concentrates during 1936; these were consigned to chemical and other pyrites-consuming industries. In the same province mining operations were resumed at the Aldermac mine and during the first half of 1937 iron pyrites concentrates were produced and stock piled at the property.

In British Columbia, shipments of iron pyrites concentrates were made to both foreign and Canadian plants from Britannia Beach by the Britannia Mining and Smelting Company Limited.

"Canadian Chemistry and Metallurgy", Toronto, quoted sulphur (October, 1937), crude, contracts f.o.b. cars at mines—long ton, \$18 to \$20. Crude, contracts, ex-vessel, St. Lawrence and Maritime ports, long ton \$23.50 to \$25.50; ground, 100 pounds, \$2.50 to \$2.75; roll, 100 pounds, \$3.50 to \$3.75. "Metal and Mineral Markets", New York, quoted pyrites (October, 1937)—per long ton unit of sulphur, c.i.f. United States ports, guaranteed 48 per cent sulphur, Spanish, 12 to 12½ cents nominal.

Table 340.—Production of Pyrites† in Canada, 1927-1936

(For the years 1886 to 1926, see Mineral Production of Canada, 1928)

Year	Pyrites	Sulphur content	Value	Year	Pyrites	Sulphur content	Value
	Tons	Tons	\$		Tons	Tons	\$
1927	50,863	25,229	198,388	1932		53,172	470,014
1928	68,836	38,589	321,033	1933		57,373	510,299
1929		42,781	350,843	1934		51,537	515,502
1930		37,730	314,835	1935		67,446	634,235
1931		50,107	429,457	1936		122,132	1,033,055

†Since 1928 includes sulphur content of pyrites at its sales value and estimated figures for quantity and value of sulphur in smelter gases used for acid making and also elemental sulphur produced at Trail, B.C., since 1933.

Table 341.—Production in Canada, Imports and Exports of Pyrites with Sulphur Content, including Sulphur Contained in Sulphuric Acid, etc., Made from Smelter Gases, 1935 and 1936

—	Pyrites*			Smelter gas		Total sulphur	
	Sales	Sulphur content		Sulphur content			
	Tons	Tons	Value	Tons	Value	Tons	Value
1935			\$		\$		\$
Quebec	15,042	7,370	47,779			7,370	47,779
Ontario				13,292	132,920	13,292	132,920
British Columbia	14,163	7,152	57,216	(b) 39,632	396,320	46,784	453,536
Canada	29,205	14,522	104,995	52,924	529,240	67,446	634,235
1936							
Quebec	86,919	43,084	282,743			43,084	282,743
Ontario				14,152	141,520	14,152	141,520
British Columbia (a)	40,293	20,084	160,672	(b) 44,812	448,120	64,896	608,792
Canada	127,212	63,168	443,415	58,964	589,640	122,132	1,033,055
				1935		1936	
				Tons	\$	Tons	\$
IMPORTS—							
Brimstone or sulphur, crude or in roll or flour				136,675	2,297,650	168,774	2,802,282
Sulphuric acid				83	9,349	108	11,366
EXPORTS—							
Sulphur contained in pyrites				7,610	48,446	52,192	284,718
Sulphuric acid				1,027	13,736	1,128	15,457

*Recovered from copper ores.

(a) In addition, iron pyrites ore was shipped for smelting purposes.

(b) Includes elemental sulphur and sulphur in sulphuric acid and direct ammonium sulphate.

Table 342.—Consumption of Sulphur by Specified Canadian Industries, 1935 and 1936

Industries	1935		1936	
	Tons	\$	Tons	\$
Wood-pulp.....	126,958	2,960,761	143,317	3,310,932
Petroleum refining.....	78	5,098	66	4,631
Acids, alkalies and salts.....	14,301	295,336	11,738	222,053
Matches.....	32	1,507	28	1,344
Explosives.....	1,576	41,098	1,902	49,427
Insecticides.....	845	29,821	1,038	42,920
Adhesives.....	67	2,187	59	1,963
Chemicals, miscellaneous.....	6	231	(a) 7	(a) 259
Rubber.....	1,134	47,464	1,189	51,059
Sugar.....	154	7,986	179	8,568
Textiles (finishing).....		78		117
Fruits and vegetables.....	26	2,131	38	3,054
Starch and glucose.....	190	6,869	191	6,118

Table 343.—World Production of Pyrites, 1934-1936

(including Cupreous Pyrites)

(Imperial Institute, London)

(Long tons)

Producing country	1934	1935	1936	Estimated sulphur content		
				1934	1935	1936
BRITISH EMPIRE						
United Kingdom.....	2,145	4,194	4,623	(a)	(a)	(a)
Southern Rhodesia.....	11,528	12,040	19,140	4,600	4,800	7,700
Union of South Africa.....	15,518	24,672	24,146	6,900	11,096	10,978
Canada (c).....	(d) 33,175	26,076	113,582	(d) 4,912	12,966	56,400
Cyprus.....	199,472	357,282	525,227	99,736	178,641	262,614
Australia.....	12,030	25,555	33,711	(a)	(a)	(a)
Total.....	274,000	450,000	720,000			
FOREIGN COUNTRIES						
Bulgaria.....	20			9		
Czechoslovakia.....	17,637	20,000	18,783	7,408	8,300	7,891
Finland (b).....	70,043	81,712	77,477	32,220	36,800	34,900
France.....	158,517	149,590	145,687	69,042	67,969	65,000
Germany.....	222,079	272,414	280,947	95,398	115,666	120,288
Greece.....	148,566	130,200	204,764	71,549	63,000	99,435
Italy.....	799,565	820,240	851,736	373,610	372,000	398,000
Norway.....	945,722	879,401	1,015,529	418,009	399,856	448,953
Poland.....	1,141	720	37,508	491	310	16,128
Portugal.....	215,937	211,362	238,791	100,000	100,000	112,000
Roumania.....	3,938	9,699	9,841	1,615	5,000	5,000
Spain.....	2,039,682	2,250,000	(a)	1,200,000	1,300,000	(a)
Sweden.....	98,984	105,128	132,086	39,461	42,398	56,114
Yugoslavia.....	22,157	82,218	78,494	10,000	37,000	36,500
U.S.S.R. (Russia).....	516,900	609,000	(a)	(a)	(a)	(a)
Algeria.....	13,425	12,952	16,280	6,175	5,950	7,814
United States (e).....	432,524	514,192	547,236	167,645	203,047	216,592
China.....	40,000	(a)	(a)	(a)	(a)	(a)
Japan.....	1,073,261	1,317,745	1,665,891	480,000	580,000	750,000
Korea.....	39,392	54,733	76,804	(a)	(a)	(a)
"Manchoukuo".....	3,000	9,000	(a)	(a)	(a)	(a)
Total.....	6,800,000	7,600,000	(a)			
World's total.....	7,100,000	8,000,000	(a)			

(a) Information not available.

(b) Pyrite concentrate only.

(c) Includes pyrite ore, also concentrates made from copper ores.

(d) Includes 23,294 tons shipped for fluxing only, this item is not included in the sulphur content figure.

(e) Includes by-product pyrite from zinc operations in Wisconsin and New York, and pyrite and pyrrhotite concentrates from copper operations in Tennessee.

SULPHURIC ACID

Production of sulphuric acid during 1936 totalled 235,338 short tons, which was the highest reported for any year and exceeded the 224,410 tons made in 1935 by 5 per cent and was 15 per cent higher than the 1934 output.

Sales of sulphuric acid by the producers during 1936 totalled 94,998 tons worth \$1,271,279 and stock on hand on December 31, 1936, amounted to 8,644 tons. The remainder of the output was used in the producers' own works, chiefly at Trail, British Columbia, for the manufacture of fertilizers and at Copper Cliff, Ontario, for making nitre cake for use in the nickel smelter at that point.

An estimate of the Canadian consumption of sulphuric acid may be made by adding the production of 235,338 tons to the imports of 107 tons and deducting the exports of 1,128 tons. This calculation shows that the apparent consumption in 1936 totalled 234,317 tons.

Imports of acids of all kinds were valued at \$1,396,631 in 1936. Stearic acid, citric acid, tartaric acid and boracic acid were the more important items. Exports of acids were appraised at \$2,684,667.

Imports of inorganic chemicals totalled \$8,557,161 in 1936, including, among the more important items, sodium cyanide, sodium nitrate, zinc oxide, sulphate of alumina, liquid chlorine, calcium chloride, sodium bicarbonate, copper sulphate, tin bichloride, borax, caustic soda, sodium bichromate, sodium phosphate, litharge and sodium silicate. Exports of inorganic chemicals amounted to \$9,656,113, mostly calcium cyanide, ammonium sulphate, sodium compounds and cobalt oxides and salts.

Table 344.—Production, Imports, Exports and Apparent Consumption of Sulphuric Acid in Canada, 1923-1936

(Short tons)

Years	Pro- duction	Imports	Exports	Apparent consump- tion (*)
1923.....	87,150	291	12,203	75,238
1924.....	71,991	47	7,678	64,360
1925.....	83,396	51	19,179	64,268
1926.....	108,229	53	28,136	80,146
1927.....	98,470	53	17,407	81,116
1928.....	96,227	54	13,329	82,952
1929.....	110,748	111	8,397	102,462
1930.....	107,352	150	571	106,931
1931.....	119,540	80	996	118,624
1932.....	136,846	62	721	136,187
1933.....	148,142	58	1,013	147,187
1934.....	205,325	82	953	204,454
1935.....	222,410	83	1,027	221,466
1936.....	235,338	107	1,128	234,317

(*) No allowance made for changes in stocks on hand.

SILICA BRICK

The production of silica brick in Canada during 1936 totalled 2,393 thousand valued at \$97,285 compared with 2,461 thousand worth \$96,194 in 1935. The manufacture of these refractories was confined in both years to the plants of the Dominion Steel and Coal Company, Ltd., at Sydney, Nova Scotia, and the Algoma Steel Corporation Ltd., Sault Ste. Marie, Ontario. The brick manufactured by both of these companies are processed from crushed silica rock and are utilized in furnace construction and repairs. Reflecting the increased production of steel was a distinct advance in the manufacture of silica brick during the first six months of 1937 when production totalled 1,000 thousand valued at \$53,299 compared with 437 thousand worth \$20,568 in the first half of 1936.

Table 345.—Production of Silica Brick in Canada, 1927-1936

Year	M	Value	Year	M	Value
		\$			\$
1927.....	1,791	79,527	1932.....	93	4,304
1928.....	3,224	155,502	1933.....	636	23,185
1929.....	3,951	173,581	1934.....	2,528	85,945
1930.....	2,418	97,379	1935.....	2,461	96,194
1931.....	900	35,746	1936.....	2,393	97,285

SODIUM CARBONATE (NATURAL)

Commercial shipments of natural sodium carbonate from Canadian deposits totalled 192 short tons valued at \$1,677 in 1936 compared with 242 tons at \$2,430 in 1935. Production of this mineral in Canada is restricted to the province of British Columbia where it occurs in the form of "natron" ($\text{NaCO}_3 + 10\text{H}_2\text{O}$) and also as brine in several lakes located principally in the Clinton mining division. Production in 1936 came from the Liberty property located some four miles east of Big Bar lake in the Clinton district; the mineral was consigned to Vancouver for the manufacture of soap. "Mineral Industry" states that the low price of sodium carbonate produced by the highly technically developed ammonia-soda industry, coupled with the difficulty of producing a pure product from the natural deposits and brines, makes the natural sodium carbonate industry relatively unimportant. Sodium carbonate, or soda ash, has many industrial uses, being employed in the manufacture of glass, soap, and in the purification of oils, etc.

Table 346.—Production* of Sodium Carbonate (Natural) in Canada, 1927-1936

Year	Tons	Value	Year	Tons	Value
		\$			\$
1927.....	805	9,995	1932.....	495	5,450
1928.....	519	4,922	1933.....	559	5,773
1929.....	600	8,100	1934.....	244	1,920
1930.....	364	4,550	1935.....	242	2,430
1931.....	712	7,351	1936.....	192	1,677

*Output confined to British Columbia.

Table 347.—Imports of Bicarbonate of Soda and Soda Ash, 1931-1936

Years	Bicarbonate of Soda		Soda Ash or Barilla	
	Pounds	\$	Pounds	\$
1931.....	10,931,335	188,268	1,647,304	25,771
1932.....	10,592,208	196,841	1,803,951	27,751
1933.....	11,716,431	211,065	1,616,483	23,256
1934.....	11,918,011	205,058	2,311,498	32,258
1935.....	12,009,724	207,325	2,647,572	37,995
1936.....	11,927,818	197,904	3,184,692	43,503

Table 349.—Consumption of Soda Ash (Sodium Carbonate) in Specified Canadian Industries

Industry	Unit	1935		1936	
			\$		\$
Chemicals and allied products (a).....	pounds	24,850,734	370,040	27,352,622	424,729
Manufactures of non-metallic minerals (b).....	pounds	47,847,466	632,715	52,222,676	673,232
Pulp and paper.....	tons	2,074	74,568	2,692	93,418
Textiles (dyeing and finishing).....	pounds	419,909	8,014	339,812	5,922
Sugar refineries.....	pounds	193,966	4,578	173,203	4,095
Dyeing, cleaning and laundry.....	pounds	682,033	16,282	617,432	16,343

(a) Includes acids, salts, explosives, soap, etc.

(b) Includes coke and gas, glass and petroleum refining.

SODIUM SULPHATE

(Glauber's Salt and Salt Cake)

Producers' shipments of natural sodium sulphate totalled 75,598 short tons valued at \$552,681 in 1936 compared with 44,817 tons at \$343,764 in 1935. The tonnage produced in 1936 established an all-time high record for the industry and the value was only surpassed by that of 1934. Production during the first six months of 1937 amounted to 37,817 short tons valued at \$264,784 against 30,610 tons worth \$235,158 in the corresponding period of 1936.

The mineral was recovered in Canada only in the province of Saskatchewan during 1936 and was produced either as hydrated sodium sulphate, known as Glauber's salt, or anhydrous sodium sulphate, known to the trade as "salt cake". It occurs as crystals (Glauber's salt) or in the form of partially saturated or saturated brines in many lakes throughout Western Canada. Some of the Saskatchewan properties are equipped with plants for the purification and dehydration of the crude salt.

Sodium sulphate finds its principal use in the pulp and paper industry for the manufacture of "Kraft paper" by the sulphate process; it is also used in the manufacture of glass, in the dyes industry, in the smelting of nickel-copper ores, and as one of the raw materials in the manufacture of sodium carbonate.

According to the Bureau of Mines, Ottawa, the product from these western deposits should find a rapidly extending market, as the by-product material from the manufacture of hydrochloric acid is each year decreasing in volume owing to the manufacture of this acid synthetically.

During 1936 five firms reported production of natural sodium sulphate; capital employed in the industry was reported at \$766,058; fuel, purchased electricity and process supplies consumed totalled \$221,294, and \$137,207 were distributed as salaries and wages to the 138 employees.

"Canadian Chemistry and Metallurgy", Toronto (October, 1937), quoted sodium sulphate (Glauber's salt), crystals in bags, cwt., to \$1.25; carlots, \$16 to \$17 per ton; anhydrous, \$32 to \$42 per ton.

Table 350.—Production of Natural Sodium Sulphate in Canada, 1927-1936

Year	Short tons	Value	Year	Short tons	Value
		\$			\$
1927.....	5,659	11,319	1932.....	22,466	271,736
1928.....	6,016	68,804	1933.....	50,080	485,416
1929.....	5,018	64,112	1934.....	66,821	587,986
1930.....	31,571	293,847	1935.....	44,817	343,764
1931.....	44,957	421,097	1936.....	75,598	552,681

Table 351.—Salt Cake Used in the Manufacture of Canadian Wood-Pulp and in the Acids, Alkalies and Salts Industry, 1932-1936

Year	Acids, alkalies † and salts industry		Wood-pulp	
	Tons	Value	Tons	Value
		\$		\$
1932.....	94	1,811	24,301	489,343
1933.....	9,968	146,201	29,563	580,251
1934.....	26,075	368,576	34,559	655,905
1935.....	22,485	316,734	35,350	642,801
1936.....	33,470	561,568	41,524	711,635

In addition to the consumption listed above, there is a relatively small quantity used in the medicinal and pharmaceutical industry.

† Includes that used direct in the treatment of nickel-copper matte in 1936.

Table 352.—Imports of Glauber's Salt and Salt Cake into Canada, 1931-1936

Years	Glauber's Salt		Salt Cake (Sulphate of Soda)	
	Pounds	\$	Pounds	\$
1931.....	1,999,042	10,858	17,321,652	97,215
1932.....	1,806,882	11,027	8,865,730	51,925
1933.....	1,791,011	13,237	5,191,036	34,371
1934.....	1,266,665	8,853	21,154,815	123,980
1935.....	3,167,715	26,591	10,352,070	49,354
1936.....	*2,510,103	27,521	(a)23,494,805	110,676

*Of the 1936 imports, 2,037,970 pounds came from Germany, 248,716 pounds came from the United States and 80,784 pounds came from the United Kingdom.

(a) Of the 1936 imports, 9,202,877 pounds came from the United States and 14,291,928 pounds from the United Kingdom.

STRONTIUM MINERALS

Four celestite (Sr SO_4) deposits of economic interest occur in eastern Ontario but there has been no commercial production of the mineral in Canada for several years. A special report prepared by the Imperial Institute, London, refers to strontium minerals as follows—"The reserves of strontium minerals, however, in both England and Germany appear to be limited, and it is possible that the known deposits in Canada, United States, France, Tunis and the U.S.S.R. will be opened up and exploited to an increasing extent in the future . . . Strontium minerals are used principally in the beet-sugar industry; in pyrotechnics; as fillers; as "cleansers" for removing sulphur and phosphorus from special steels; as precipitants in the purification of caustic soda; in the chemical, pharmaceutical and ceramic industries, and in certain refrigerators." World production of celestite and strontianite in 1934 totalled 9,981 long tons. Prices of English celestite at the quarry during recent years have ranged from about 12s. 6d. per long ton for second grade material up to 32s. per long ton for best quality. No imports of these minerals into Canada were reported in either 1935 or 1936.

CHAPTER NINE

CLAY PRODUCTS AND OTHER STRUCTURAL MATERIALS

Including Cement, Clay and Clay Products (Brick, Drain Tile, Kaolin, Sewer Pipe, Structural Tile, Stoneware and Pottery made from Domestic Clays, Fireclay, Firebrick, Fireclay Blocks and Shapes, Imported-Clay Products), Lime, Sand and Gravel, Sand-Lime Brick, and Stone, including Slate.

Grouped in this chapter are those industries producing structural materials of non-metallic composition. During the depression years, immediately following 1929, these important branches of the Canadian mineral industry suffered severe economic losses. Production declined and employment fell to a relatively low level. Shipments of cement, lime, stone, sand and gravel totalled \$58,534,834 in 1929; this high value was succeeded by unbroken annual decreases to \$16,696,683 in 1933, from which year recovery has been relatively slow but definite with a production value of \$25,770,741 being recorded for 1936.

There has been an increasing consumption of stone and lime for other than building purposes. This has been particularly evident in recent years and is the result of expansion in certain industries where these materials are utilized in various chemical processes. Shipments of stone and lime for these purposes are classified, for convenience, with data relating to production of these same materials for structural purposes, however, statistics pertaining to their consumption for industrial purposes are segregated in the following tables.

Table 353.—Value of Construction Contracts Awarded, by Provinces, 1932-1936

(Maclean Building Reports Ltd.)

Provinces	1932	1933	1934	1935	1936
	\$	\$	\$	\$	\$
Maritimes.....	9,339,500	7,218,700	9,968,600	14,373,500	17,908,800
Quebec.....	52,525,300	32,539,200	34,135,500	44,471,900	45,749,500
Ontario.....	49,291,800	42,573,400	63,358,300	70,872,800	72,393,300
Manitoba.....	4,503,500	2,138,000	3,905,000	8,744,400	6,994,400
Saskatchewan.....	2,705,200	775,200	1,563,200	3,841,300	2,200,600
Alberta.....	5,948,200	2,825,900	3,489,400	5,893,000	6,297,400
British Columbia.....	8,558,900	9,219,400	9,391,500	12,108,100	11,044,000
Canada.....	132,872,400	97,289,800	125,811,500	160,305,000	162,588,000

Table 354.—Description, Classification and Value of Work Performed in Canada by General and Trade Contractors (including Subcontractors), Municipalities, Harbour Commissions, Provincial and Dominion Government Departments in 1936

	New construction	Alterations maintenance and repairs	Total value
	\$	\$	\$
BUILDING CONSTRUCTION—			
Dwellings, single.....	17,526,140	4,649,277	22,175,417
Dwellings, semi-detached or double.....	1,762,388	458,126	2,220,514
Duplexes.....	2,467,291	373,196	2,840,487
Apartment houses.....	3,018,489	1,010,722	4,029,211
Hotels, clubs and restaurants.....	1,241,095	633,916	1,875,011
Churches and church halls.....	1,480,453	244,700	1,725,153
Schools and institutions.....	3,576,310	396,728	3,973,038
Hospitals and sanatoria.....	3,306,192	212,504	3,518,696
Office buildings.....	2,869,186	1,648,258	4,517,444
Stores.....	2,857,017	2,924,543	5,781,560
Theatres.....	1,635,784	255,083	1,890,867
Factories and warehouses.....	11,145,960	6,060,552	17,206,512
Grain elevators.....	1,517,253	1,592,427	3,109,680
Garages.....	1,288,617	294,293	1,582,910
Farm buildings.....	545,449	231,614	777,063
Government and municipal buildings.....	10,975,920	1,815,813	12,791,733
Service stations.....	642,571	1,160,011	1,802,582
Mine buildings.....	6,109,738	320,439	6,430,177
All other building (not specified).....	871,579	979,199	1,850,778

Table 354.—Description, Classification and Value of Work Performed in Canada by General and Trade Contractors (including Subcontractors,) Municipalities, Harbour Commissions, Provincial and Dominion Government Departments in 1936—Concluded

	New construc- tion	Alterations, maintenance and repairs	Total value
	\$	\$	\$
ENGINEERING CONSTRUCTION—			
Paved streets and highways	18,135,090	4,440,330	22,575,420
Dirt or clay roads	3,683,735		3,683,735
Other streets and highways	16,288,664	9,010,548	25,299,212
Grading, scraping, oiling, filling, etc.		5,483,573	5,483,573
Roadside maintenance and area improvement	89,237	1,345,300	1,434,537
Sidewalks	417,588	738,374	1,155,962
Fencing and guard rails	292,640	76,922	369,562
Signs and zone painting	116,729	101,843	218,572
Bridges, viaducts, etc.	6,748,261	1,508,368	8,256,629
Crossings, overhead	165,064	11,138	176,202
Culverts	1,024,804	284,207	1,309,011
Subways and tunnels	322,460		322,460
Watermains and waterworks systems and connections	1,930,979	2,169,051	4,100,030
Sewers and sewage disposal works	2,944,292	935,728	3,880,020
Open sewers or drains	422,485	225,101	647,586
Dams and reservoirs	1,011,944	122,176	1,134,120
Central electric stations, light and power plants	5,817,345	2,865,441	8,682,786
Installation of boilers and machinery	2,168,067	182,965	2,351,032
Transmission lines and towers	3,770,432	1,342,159	5,112,591
Railway construction work, steam and electric	346,653	361,829	708,482
Structural steel work	915,037	21,593	936,630
Aerodromes or landing fields	245,993	38,282	284,275
Wrecking and demolition		310,709	310,709
Park systems	408,404	1,017,992	1,426,396
Grounds and walks	65,089	207,546	272,635
Underground conduits	179,278		179,278
All other engineering (not specified)	2,476,457	2,151,547	4,628,004
HARBOURS, RIVERS, ETC.—			
Docks, wharves, piers and breakwaters	5,636,215	3,342,078	8,978,293
Retaining walls, embankments, dykes and defences	723,286	459,118	1,182,404
Canals and waterways	25,987		25,987
Dredging	3,465,134	932,225	4,397,359
Pile driving	62,562	63,339	125,901
All other works (not specified)	7,205	50,799	58,004
TRADE CONSTRUCTION—			
Air-conditioning	68,322		68,322
Brick-laying	699,371	227,018	926,389
Carpentry work	354,577	1,022,067	1,376,644
Commercial refrigeration	79,427	37,927	117,354
Concreting and cement work	740,999	351,832	1,092,831
Electrical work	1,847,954	2,519,625	4,367,579
Elevators, service	612,366	875,402	1,487,768
Excavating	542,652	84,086	626,738
Flooring, wood	59,480	139,892	199,372
Flooring, other	34,068	78,733	112,801
Glass and glazing	196,998	318,675	515,673
Heating and plumbing	5,958,793	8,106,381	14,065,174
Lathing, plastering and stucco	458,777	560,006	1,018,783
Masonry and stone work	205,895	101,737	307,632
Ornamental iron work	264,189	93,218	357,407
Painting and decorating	748,715	3,766,662	4,515,377
Roofing, sheet metal	238,606	675,776	914,382
Roofing, all other	275,900	977,336	1,253,236
Sheet metal work, other than roofing	972,308	1,479,156	2,451,464
Tiling and marble work	317,026	301,406	618,432
Weatherstripping and insulation	264,949	266,036	530,985
Sprinkler installation	303,871	66,106	369,977
All other trades (not specified)	656,033	283,817	939,850
Total value of work performed	170,645,824	87,394,576	258,040,400

(Construction Branch, Dominion Bureau of Statistics.)

Table 355.—Value of Clay Products and Other Structural Materials Produced in Canada, by Provinces, 1932-1936

Province	1932	1933	1934	1935	1936
	\$	\$	\$	\$	\$
Prince Edward Island.....					27,663*
Nova Scotia.....	432,075	378,320	511,026	1,660,981	1,763,516
New Brunswick.....	779,492	644,570	669,726	1,241,957	931,827
Quebec.....	8,062,951	5,747,715	6,115,682	7,241,494	7,503,022
Ontario.....	8,827,968	7,340,086	8,988,681	8,894,538	10,326,967
Manitoba.....	1,259,733	667,012	761,742	1,459,614	1,666,789
Saskatchewan.....	176,681	111,938	260,030	269,320	380,115
Alberta.....	1,039,093	654,334	843,629	973,774	1,245,549
British Columbia.....	1,820,290	1,152,712	1,136,245	1,473,722	1,925,293
Canada—Gross value.....	22,398,283	16,696,687	19,286,761	23,215,400	25,770,741
Net value.....	(a)	(a)	(a)	19,253,309	21,052,574

(a) Information not available.

*Sand and gravel only.

See footnote page 000.

Table 356.—Production, Imports, Exports, and Apparent Consumption of Clay Products and Other Structural Materials in Canada, 1934-1936

Item	Production	Imports	Exports	Apparent consumption
	\$	\$	\$	\$
Cement, Portland.....	1934 5,667,946	†49,715	55,181	5,662,480
	1935 5,580,043	†77,181	44,365	5,612,859
	1936 6,908,192	†114,321	56,909	6,965,604
Clay and clay products.....	1934 2,680,410	5,935,805	186,359	8,429,856
	1935 3,012,563	6,438,042	363,164	9,087,441
	1936 3,471,027	7,351,148	526,856	10,295,319
Lime.....	1934 2,745,797	5,118	151,983	2,598,932
	1935 2,925,791	9,181	50,296	2,884,676
	1936 3,335,970	12,036	97,574	3,250,432
*Sand and gravel.....	1934 4,035,477	283,088	17,079	4,301,486
	1935 6,389,440	364,693	21,446	6,732,687
	1936 6,921,399	348,492	73,624	7,196,267
Slate.....	1934 4,802	(a) 40,966	.....	45,768
	1935 4,329	(a) 36,388	.....	40,717
	1936 5,414	(a) 34,155	.....	39,569
Stone.....	1934 4,152,329	447,668	104,969	4,495,018
	1935 5,303,234	415,924	110,895	5,608,263
	1936 5,128,739	448,526	105,182	5,472,083
Total.....	1934 19,286,761	6,762,360	515,571	25,533,540
	1935 23,215,400	7,341,409	590,166	29,966,643
	1936 25,770,741	8,308,678	860,145	33,219,274

*Sand and gravel imports include silica sand for glass and carborundum manufacture and for use in steel plants. This silica sand was valued at \$226,188 in 1934, \$282,930 in 1935 and \$270,824 in 1936.

†Includes cement manufactures.

(a) Include slate manufactures.

CEMENT

Although the first official record of the production of cement in Canada is that of the manufacture of hydraulic cement from the black limestones of Quebec in 1856, it is understood that lime and hydraulic cement were made at Hull between 1830 and 1840. Plants were also operated at an early date in Quebec at the mouth of the Magdalen river, Gaspé county, and in Argenteuil county; in Ontario at Kingston and Thorold. It was not until 1887 that serious competition to the domestic production showed itself in large importations of Portland cement; in that year Canadian output totalled 69,843 barrels valued at \$81,909. Canadian Portland cement made its appearance on the market in 1889. The period 1898 to 1905 was the scene of a boom in the construction and promotion of cement plants in Canada; eleven marl plants were erected during

these years, of which only three were really successful. Later years witnessed the abandonment of the marl process and the development of the present limestone or limestone-clay slurry method of production. The high point in Canadian cement production was recorded in 1929 when shipments amounted to 12,284,081 barrels valued at \$19,337,235.

During 1936, cement was produced in Quebec, Ontario, Manitoba, Alberta and British Columbia with 46.4 per cent and 34.2 per cent of the Dominion output coming from Quebec and Ontario, respectively.

Four firms were reported as active in 1936 and \$53,343,991 was employed as capital; the number of employees totalled 1,052 compared with 924 in 1935; salaries and wages distributed were recorded at \$1,196,664 against \$1,027,416 in the preceding year. The industry in 1936 consumed \$1,576,142 worth of fuel and electricity, 1,180,358 tons of limestone, 25,447 tons of gypsum, 94,943 tons of clay and 8,549 tons of sand. The high selling price per barrel for cement in 1936 was \$2.68 and the low, \$1.25, compared with \$2.79 and \$1.25 in 1935.

From a national production of over twelve million barrels of cement in 1929, there was a drop of seventy-five per cent to the depression low of 1933. A definite improvement in the industry was reflected in the production figures for 1936 when increases of 23.6 per cent in quantity and 23.8 per cent in value over those of the preceding year were realized. This improvement is continuing, as evidenced by a production of 2,922,726 barrels during the first seven months of 1937, or an increase of 33.1 per cent above the quantity shipped in the corresponding period of 1936.

It is worthy of note that in a number of fields the use of cement has proved to be increasingly popular in the past year. For instance, the province of Ontario, in its road programme, called for more than 250 miles of concrete pavement, compared with 70 miles the year previous. In addition, the Department of Highways of Ontario built over 50 concrete bridges this year, most of them of the rigid frame type.

The modernistic type of house building lends itself readily to the use of concrete and great interest is being shown by home builders in its possibilities. A number of these cement houses have been constructed and several architectural monolithic concrete structures are under way, and more are proposed.

Under the provisions of the Home Improvement Plan, by which farm buildings were permitted to be financed, a good impetus has been given to the use of cement on the farm. This is a field which is capable of much further expansion.

There are many factors which lead one to believe that the usefulness of cement, as a construction material, will continue to increase. Its adaptability to exacting conditions and severe climatic changes, its permanent nature and favourable costs as compared with many other competing materials, all combine to encourage its use. The speed with which it can be placed and set, with the use of modern machinery, together with its safety features, appeal to the road engineer. The requirements of civic by-laws make its use desirable in "fire-safe" residential construction, garages, and public buildings.

It is worthy of note that this material, over a period of several years, has been available to the consumer at prices which have not suffered severe fluctuations and that the quality of the Canadian product has been maintained. It would seem to be most likely that in the upward march of construction, cement will play a large part in giving employment in highway, sewer, dock, bridge and building construction.

"During the past few years there has been widespread interest in the low-cost road . . . A great deal of publicity has been given to the stabilization of road surfaces, but little attention has been paid to improving the soil on the roadbed prior to stabilization, and practically none to improving the foundations. . . . The use of Portland cement in soil stabilization is in the experimental or development stage. Experiments on a small scale started in 1933 in South Carolina showed definite promise, and since that time more enlarged field investigations have been carried on. Last year research jobs were constructed in Wisconsin, Michigan, Illinois and Missouri. In South Carolina the soils treated consisted of a natural fine sand and clay mixture. In Wisconsin the soil treated was a loose fine sand to which approximately 20 per cent silty clay soil was added prior to cement stabilization. In Missouri the soil treated is reported to have been clay." —(Prof. F. C. Lang, University of Minnesota.)

Table 357.—Principal Statistics of the Cement-making Industry in Canada, 1935 and 1936

	1935	1936
Number of firms.....	4	4
Number of plants.....	9	9
Capital employed.....	52,454,004	53,343,991
Number of employees—On salary.....	78	8
On wages.....	846	961
Total.....	924	1,052
Salaries and wages—Salaries.....	150,587	173,001
Wages.....	876,829	1,023,663
Total.....	1,027,416	1,196,664
Selling value of products (gross).....	5,580,043	6,908,192
Cost of fuel and electricity (b).....	1,227,410	1,576,142
Cost of process supplies (c).....	394,264	592,929
Net value of products sold.....	3,958,369	4,739,121

(a) Information not available.

(c) Other than item (b).

Table 358.—Capital Employed in the Cement Industry in Canada, 1936

	\$
CAPITAL EMPLOYED AS REPRESENTED BY:—	
(a) Present cash value of the land.....	12,091,763
(b) Present value of buildings, fixtures, machinery, tools and other equipment.....	36,204,720
(c) Inventory value of materials on hand, ore in process, fuel and miscellaneous supplies on hand.....	840,175
(d) Inventory value of finished products on hand.....	1,267,918
(e) Operating capital (cash, bills and accounts receivable, prepaid expenses, etc.).....	2,939,415
Total.....	53,343,991

Table 359.—Wage-Earners on 15th of Each Month or Nearest Representative Date, 1935 and 1936

Month	1935	1936	
		Quarry	Mill
January.....	705	44	721
February.....	660	43	705
March.....	671	63	52
April.....	687	121	906
May.....	802	107	1,017
June.....	820	160	901
July.....	837	167	917
August.....	947	117	921
September.....	1,042	120	929
October.....	964	122	926
November.....	943	97	886
December.....	896	82	778

Table 360.—Production and Apparent Consumption of Cement in Canada, 1927-1936

Year	Sold or used		Apparent consumption
	Barrels	Value	Barrels
		\$	
1927.....	10,065,865	14,391,937	9,835,525
1928.....	11,023,928	16,739,163	10,790,650
1929.....	12,284,081	19,337,235	12,105,950
1930.....	11,032,538	17,713,067	10,977,238
1931.....	10,161,658	15,826,243	10,085,986
1932.....	4,498,721	6,930,721	4,466,738
1933.....	3,007,432	4,536,935	2,974,020
1934.....	3,783,226	5,667,946	3,727,521
1935.....	3,648,086	5,580,043	3,610,217
1936.....	4,508,718	6,908,192	4,479,656

Table 361.—Output, Sales, Imports, Exports and Consumption of Cement in Canada, 1935-1936

	1935		1936	
	Barrels	Value	Barrels	Value
		\$		\$
OUTPUT.....	3,487,602		4,939,030	
SOLD OR USED.....	3,648,086	5,580,043	4,508,718	6,908,192
STOCKS, Dec. 31.....	1,402,017		1,832,380	
IMPORTS—				
Portland cement.....	17,738	60,079	39,867	107,180
Manufactures.....		17,102		7,141
EXPORTS PORTLAND CEMENT.....	55,607	44,365	68,929	56,909
APPARENT CONSUMPTION.....	3,610,217		4,479,656	

1 barrel=350 pounds.

Table 362.—Producers Sales of Cement in Canada, by Provinces, 1935-1936

Province	1935		1936	
	Barrels	Value	Barrels	Value
		\$		\$
Quebec.....	1,751,012	2,472,008	2,093,130	2,945,074
Ontario.....	1,243,836	1,752,148	1,542,463	2,180,895
Manitoba.....	266,457	604,857	348,042	783,095
Alberta.....	219,555	436,914	243,534	482,197
British Columbia.....	167,226	314,116	281,549	516,931
Canada.....	3,648,086	5,580,043	4,508,718	6,908,192

Table 363.—Kilns Used by Canadian Cement Industry, 1932-1936

Year	Rotary	Total daily capacity
	No.	Barrels
1932.....	47	43,822
1933.....	41	43,622
1934.....	41	43,922
1935.....	20	32,650
1936.....	19	33,000

Table 364.—Limestone, Gypsum, Sand, and Clay Used in Canadian Cement Plants, 1931-1936

Year	Limestone	Gypsum	Sand	Clay
	Tons	Tons	Tons	Tons
1931.....	2,489,147	56,677	(a)	(a)
1932.....	1,141,376	27,538	(a)	(a)
1933.....	166,364	13,319	(a)	(a)
1934.....	806,546	19,172	(a)	(a)
1935.....	818,443	21,611	5,047	(a)
1936.....	1,180,358	25,447	8,549	94,943

(a) Data not recorded.

THE CEMENT PRODUCTS INDUSTRY

A total of 97 manufacturing plants were included in this industry in 1936; 59 were in Ontario, 22 in Quebec, 8 in British Columbia, 2 in each of New Brunswick, Manitoba and Alberta, and 1 in each of Nova Scotia and Saskatchewan. Many of these plants were very small, there being 51 with outputs of less than \$5,000, 16 in the \$5,000 to \$10,000 group, 20 between \$10,000 and \$25,000, and only 10 with outputs in excess of \$25,000. The works in Ontario accounted for 64 per cent of the total production and the factories in Quebec accounted for 15 per cent.

Construction work, such as the building of foundations, dams, bridges, etc., is not classed as manufacturing and is not included in this industry.

Table 365.—Products Made in the Cement Products Industry, by Provinces, 1936

Products	Quebec	Ontario	British Columbia	Other provinces	Canada
	\$	\$	\$	\$	\$
Cement bricks.....	18,833	40,527	3,546	126	63,032
Cement hollow building blocks.....	68,858	237,896	1,602	6,785	315,141
Cement drain pipe, sewer pipe, water pipe and culvert tile.....	102,920	47,059	251,108	31,337	432,424
Artificial stone.....	46,831	69,563	2,843	14,392	133,629
Cement laundry tubs.....		106,342	7,205		113,547
Cinder blocks.....	6,032	161,318			167,350
Cement stucco.....		7,480	11,036	4,976	23,492
All other products.....	16,561	430,130	14,373	3,668	464,732
Total.....	260,035	1,100,315	291,713	61,284	1,713,347

Table 366.—Materials Used in the Cement Products Industry, by Provinces, 1936

Materials	Quebec	Ontario	British Columbia	Other provinces	Canada
	\$	\$	\$	\$	\$
Portland cement.....	52,247	193,282	36,487	9,165	291,181
Quicklime.....	85	315	957	93	1,450
Sand.....	10,219	36,158	7,226	1,489	55,092
Gravel.....	1,684	18,442	3,549	2,654	26,329
Crushed stone.....	16,679	6,081	1,703	130	24,593
Cinders.....	598	15,696			16,294
Reinforcing steel.....	9,515	31,182	69,268	2,642	112,607
Other materials.....	11,712	147,674	59,404	2,711	221,501
Boxes, crates, lumber, etc.....	370	12,553	817	234	13,974
Total.....	103,109	461,383	179,411	19,118	763,021

CLAY AND CLAY PRODUCTS INDUSTRY

The Clay and Clay Products Industry in Canada is classified into two divisions: (1) production from domestic clays, which includes the production of refractories, building brick, structural tile, floor tile, roofing tile, drain tile, sewer pipe and pottery, and (2) production from imported clays, which includes the manufacture of porcelain insulators, refractories, earthenware, pottery and ceramic floor and wall tile.

A total of 160 plants, representing a capital investment of \$24,079,765 operated in the domestic and imported clay products industries in Canada during 1936. These two industries provided employment for 2,854 persons during the year; their earnings totalled \$2,499,195. The combined production in 1936 was valued at \$6,377,459 compared with \$5,187,540 in 1935.

1. Production from Domestic Clays

Producers' sales of domestic clay and domestic clay products in Canada totalled \$3,471,027 in 1936 compared with \$3,012,563 during 1935. This increase of 15.2 per cent reflects a slow but steady improvement in the Canadian Clay Products Industry since the depression low of \$2,262,835 in 1933. Gains in the total value of sales were realized in every province with the exception of Manitoba, Saskatchewan and Alberta.

Sales of building brick during 1936 were recorded at 115,732 thousand valued at \$1,748,772, this quantity being the largest since 1931. Sales of hollow structural blocks totalled 58,501 short tons worth \$467,860, and as in the case of brick, was the largest output reported during the past five years. Increases in the value of production over 1935 for other clay products were fairly widespread, with gains being attained for fireclay, firebrick, paving brick, floor tile and sewer pipe.

Ontario and Quebec continue to command outstanding positions as producers of clay products in Canada. In 1936 the total value of these materials shipped by Ontario producers was \$1,573,936 or 45.3 per cent of the Dominion total; during the same period, sales by producers in Quebec amounted to \$691,765 or 19.9 per cent of the total Canadian output of clay products.

Refractory clays or refractory clay products were produced during 1936 in Nova Scotia, New Brunswick, Saskatchewan and British Columbia. Production of fireclay blocks and shapes in Saskatchewan totalled \$46,968 or 72.1 per cent of the entire Canadian output. Firebrick produced in 1936 amounted to 2,548 thousand valued at \$118,923 compared with 1,817 thousand worth \$90,149 in 1935; of the 1936 output, 2,133 thousand valued at \$98,282 originated in the province of British Columbia.

The value of pottery manufactured from domestic clays fell off slightly from \$220,711 in 1935 to \$218,402 in 1936; production of this type of pottery is confined in Canada to New Brunswick, Ontario, Alberta and British Columbia. Of the total value of shipments in 1936, those made by Alberta manufacturers amounted to \$134,491.

In 1936 bentonite was produced only in British Columbia where a relatively small shipment was reported as being destined partly for experimental use.

Consumption of Fullers' earth and other clays by the Canadian Petroleum Products Industry during 1936 totalled 9,454 short tons valued at \$243,164. Fullers' earth consumed in the manufacture of soaps in 1936 amounted to 664 short tons worth \$20,601 while china clay utilized in the making of Canadian paper aggregated 39,165 short tons at \$520,121. In 1935, the last year for which statistics are complete, there were used in the manufacture of iron and steel 11,510 short tons of fireclay valued at \$101,601; \$451,604 worth of firebrick (134.6 per cent increase over 1934), and \$28,064 worth of cupola blocks; in the same year the Canadian rubber industry consumed 2,639 short tons of clay and earths which were appraised at \$63,553. No production of kaolin or Fullers' earth, known as such, was reported in Canada during 1936.

Clays and shales excavated in Canada are utilized chiefly in the direct production of the heavy clay products. The recovery of the raw material is generally a surface operation, however, in Canada underground mining of clays and shales is carried on in Nova Scotia at Shubenacadie and Musquodoboit; in New Brunswick, in the Minto coal fields (in conjunction with the mining of coal); in Saskatchewan, in the southwestern part; in Alberta, at Redcliff; and in British Columbia, at Kilgard.

China clay occurs in the St. Remi d'Amherst district of Quebec and commercial shipments of the material have been made from these deposits. A report issued by the Bureau of Mines, Ottawa, states—"Deposits of high-grade, white-burning clays occur on the Mattagami, Abitibi, and Missinaibi rivers in northern Ontario. Some of these clays may be classed as ball clays and others as china clays. Recent developments at two points in this area will probably result in a small production of clay in the near future. Ball clays of high bond strength occur in extensive deposits in southern Saskatchewan, about 60 miles south of Moose Jaw.

"Bentonite is the name given to a peculiar type of clay resulting from the alteration in place of volcanic dust beds. This clay consists of exceedingly fine particles, and possesses colloidal character. Occurrences of clay of bentonitic type are numerous in the Prairie Provinces, some of the deposits probably being thick enough to possess economic importance. Several extensive beds also exist in the Princeton-Merritt area in British Columbia. Canadian bentonite deposits are probably adequate to fill domestic requirements for this class of clay, the principal consumption of which in Canada is in the decolorizing and clarifying of mineral lubricating oils, gasoline, and vegetable and animal oils as well as in the foundry industry, where it is used as an ingredient of core washes and to rejuvenate spent moulding sands. Much of the clay used for decolorizing (bleaching) purposes has undergone "activation" by treatment with sulphuric acid. Activated clay is obtained (1936) wholly from American firms specializing in the production of this class of material; so far, little serious interest has been shown in developing a Canadian bentonite industry and most of the powdered clay used is imported from the United States."

The west of England has been, for many years, the most important source of china clay in the world. According to the Imperial Institute, London, the production in 1929 amounted to 826,046 long tons, being only 40,000 tons less than the record output for 1927. From 1930 to 1932, however, the production seriously declined, and in 1932 it was approximately half a million tons. Since that year the industry has largely recovered, owing principally to increased shipments to the United States, Germany and elsewhere. The production in 1935 was 707,572 long tons. Chinastone, known also as Cornish stone, is a variety of granite (semi-decomposed) rich in fluorine minerals and low in iron content. It is raised entirely in Cornwall and is used principally as a raw material in the manufacture of pottery. The output in 1935 amounted to 57,160 long tons.

In this section all tables show data for the domestic clay products industry only.

Table 367.—Capital Employed in the Clay Products Industry in Canada, by Provinces, 1936

Industry and province	Capital employed as represented by:					Total
	Present value of land†	Present value of buildings, fixtures, machinery, tools and other equipment	Inventory value of materials on hand, stocks in process, fuel, etc.	Inventory value of finished products on hand	Operating capital, including cash, bills and accounts receivable, etc.	
	\$	\$	\$	\$	\$	\$
By INDUSTRIES—						
*Brick and Tile—						
Nova Scotia.....	120,728	600,362	82,339	80,117	24,616	908,162
New Brunswick.....	25,314	167,908	991	20,459	16,384	231,056
Quebec.....	503,060	3,719,970	73,010	894,859	313,691	5,504,590
Ontario.....	2,303,963	4,905,554	106,670	777,993	1,235,509	9,329,689
Manitoba.....	14,000	126,750	1,000	32,557	44,972	219,279
Saskatchewan.....	287,056	451,232	6,198	49,544	77,044	871,074
Alberta.....	142,471	1,082,846	67,807	141,625	174,485	1,619,234
British Columbia.....	123,960	498,310	7,290	96,404	78,179	804,143
Total for Canada.....	3,520,552	11,562,932	345,305	2,093,558	1,964,880	19,487,227
Stoneware and pottery—						
Total for Canada.....	36,228	194,928	30,477	52,267	62,304	376,204
By PROVINCES—						
Total for clay and clay products—						
Nova Scotia.....	120,728	600,362	82,339	80,117	24,616	908,162
New Brunswick.....	25,314	176,304	3,972	27,107	32,330	266,027
Quebec.....	503,060	3,719,970	73,010	894,859	313,691	5,504,590
Ontario.....	2,314,813	4,947,354	108,220	784,219	1,261,783	9,416,389
Manitoba.....	14,000	126,750	1,000	32,557	44,972	219,279
Saskatchewan.....	287,056	451,232	6,198	49,544	77,044	871,074
Alberta.....	166,849	1,237,578	93,753	181,018	194,569	1,873,767
British Columbia.....	123,960	498,310	7,290	96,404	78,179	804,143
Canada.....	3,556,780	11,757,860	375,782	2,145,825	2,027,184	19,863,431

* Clay, sewer pipe, firebrick, firebrick products and other clays included under Brick and Tile.

† Excluding unmined material.

Table 368.—Employees, Salaries and Wages in the Clay Products Industry in Canada, by Provinces, 1936

Province	*Average number of employees			Salaries and wages		
	Salaried employees	Wage-earners	Total	Salaries	Wages	Total
1936				\$	\$	\$
Nova Scotia.....	4	121	125	11,534	96,337	107,871
New Brunswick.....	8	69	77	10,146	36,567	46,713
Quebec.....	58	365	423	85,715	228,167	313,882
Ontario.....	100	627	727	171,910	477,567	649,477
Manitoba.....	6	41	47	10,000	29,256	39,256
Saskatchewan.....	7	26	33	15,619	21,528	37,147
Alberta.....	30	174	204	59,109	121,890	180,999
British Columbia.....	16	123	139	26,704	96,099	122,803
Canada.....	229	1,546	1,775	390,737	1,107,411	1,498,148

* See note page 28.

Table 369.—Average Number of Wage-Earners, by Months, 1926 and 1936

Month	1926	1936	
		Pit	Plant
January.....	1,936	29	665
February.....	1,963	30	695
March.....	2,591	30	697
April.....	3,179	51	928
May.....	4,188	239	1,531
June.....	4,695	331	1,875
July.....	4,686	368	2,032
August.....	4,505	353	1,923
September.....	3,950	387	1,873
October.....	3,790	283	1,628
November.....	3,273	97	1,204
December.....	2,714	49	998

Table 370.—Production of Clay Products in Canada from Domestic Clays, by Provinces, 1927-1936

(For the years 1886 to 1926 see Mineral Production of Canada, 1928)

Year	Nova Scotia	New Brunswick	Quebec	Ontario	Manitoba	Saskatchewan	Alberta	British Columbia	Canada
	\$	\$	\$	\$	\$	\$	\$	\$	\$
1927.....	416,417	87,185	2,734,738	5,853,035	201,464	311,204	889,358	679,788	11,173,189
1928.....	496,577	72,192	3,087,295	6,177,664	291,791	377,896	1,162,264	706,039	12,881,718
1929.....	653,157	160,006	3,187,702	6,830,162	362,240	502,522	1,342,427	866,427	13,904,643
1930.....	495,333	162,536	2,464,044	5,221,114	215,967	349,283	997,685	687,516	10,593,578
1931.....	467,126	143,348	2,360,908	3,552,800	122,628	166,257	529,716	498,505	7,841,288
1932.....	172,557	68,151	1,064,551	1,639,508	49,773	109,739	329,584	216,355	3,650,213
1933.....	125,500	46,917	580,088	1,024,579	20,966	92,207	198,373	174,205	2,262,835
1934.....	157,158	59,897	632,322	1,261,006	37,916	90,997	246,677	194,437	2,680,410
1935.....	270,478	62,478	593,162	1,370,225	74,755	98,150	326,679	216,636	3,012,563
1936.....	355,254	102,256	691,765	1,573,936	55,564	95,584	315,777	280,891	3,471,027

Table 371.—Production (Sales) of Domestic Clay and Clay Products in Canada, 1935 and 1936

Products	Unit of measure	Sales or shipments			
		1935		1936	
		Quantity	\$	Quantity	\$
Clay—Fullers' earth.....	ton	.....	.....	.....	.....
Bentonite.....	ton	41	781	120 (*)	180
Fireclay.....	ton	2,272	15,574	2,437	17,639
Kaolin (china clay).....	ton	170	1,520	.....	.....
Fireclay blocks and shapes.....	\$	.....	71,344	.....	65,171
Firebrick.....	M	1,817	90,149	2,548	118,923
Brick, Soft mud process—Face.....	M	6,695	122,215	6,097	111,378
Common.....	M	21,197	259,504	24,180	302,690
Stiff mud process (wire cut)—Face.....	M	25,289	500,066	30,218	575,765
Common.....	M	32,334	437,123	35,592	484,078
Dry press—Face.....	M	8,454	175,042	8,961	165,924
Common.....	M	6,381	55,253	10,241	100,785
Fancy or ornamental brick (including special shapes, embossed and enamelled brick).....	M	13	728	25	1,374
Sewer brick.....	M	175	5,236	418	6,778
Paving brick.....	M	15	627	116	3,149
Structural tile—					
Hollow blocks (including fireproofing and load-bearing tile).....	ton	47,195	344,608	58,501	467,860
Roofing tile.....	No.	82,015	3,669	52,730	2,139
Floor tile (quarries).....	sq. ft.	51,765	7,629	97,738	13,798
Ceramic or glazed floor and wall tile.....	\$	.....	615	.....	.....
Drain tile.....	M	7,124	205,336	8,148	214,590
Sewer pipe (including copings, flue linings, etc.).....	\$	.....	481,559	.....	588,485
Pottery, glazed or unglazed (including coarse earthenware, stoneware, and all other pottery).....	\$	.....	220,711	.....	218,402
Other products.....	\$	.....	13,274	.....	11,919
Total.....	\$	.....	3,012,563	.....	3,471,027

(*) Partly used for experimental purposes and produced in British Columbia.

Table 372.—Production of Building Brick in Canada, by Provinces, 1936

		Nova Scotia	New Brunswick	Quebec	Ontario	Manitoba	Saskatchewan	Alberta	British Columbia
Soft mud process	Face.....M	676		215	4,914			58	234
	\$	14,026		2,363	84,210			1,332	9,447
	Common.....M	4,546	1,477	2,482	8,443	2,639		2,504	2,089
	\$	52,702	20,653	22,057	113,088	40,958		23,928	29,304
Stiff mud process (wire cut)	Face.....M	53	128	9,803	19,271	283	355	13	312
	\$	901	3,188	191,085	352,053	7,012	11,834	227	9,465
	Common.....M	696	658	18,922	13,644		324	110	1,238
	\$	8,379	8,279	248,647	197,475		3,385	780	17,133
Dry press	Face.....M			2,161	5,341		87	1,372	
	\$			52,096	95,755		3,746	14,327	
	Common.....M				3,906		11	6,324	
	\$				57,079		210	43,496	
Fancy or ornamental brick.....M					24			1	
\$					1,295			79	
Sewer brick.....M					416				2
\$					6,723				55
Total.....M		5,971	2,263	33,583	55,959	2,922	777	10,382	3,875
\$		76,008	32,120	516,248	907,678	47,970	19,175	84,169	65,404

Table 373.—Production of Building Brick in Canada, 1927-1936

	Soft mud process		Stiff mud process (wire cut)		Dry press		Fancy or ornamental brick	Sewer brick	Total
	Face	Common	Face	Common	Face	Common			
1926.....M	28,235	78,158	101,028	94,046	30,423	19,450	462	6,546	358,348
\$	556,573	1,145,490	2,146,362	1,624,055	651,236	260,598	24,057	117,194	6,525,565
1927.....M	16,196	70,554	95,480	150,222	39,753	14,617	620	10,997	398,439
\$	325,966	1,091,274	2,024,064	2,239,180	833,570	187,062	29,372	210,643	6,941,131
1928.....M	17,532	93,280	101,717	144,404	36,587	24,294	599	2,888	421,301
\$	349,847	1,328,981	2,247,472	2,182,307	748,301	337,096	28,763	59,010	7,281,777
1929.....M	26,624	77,399	114,093	170,840	38,591	26,131	187	4,765	458,630
\$	538,096	1,195,511	2,469,417	2,509,451	813,461	368,039	12,795	96,588	8,003,358
1930.....M	11,350	56,487	99,284	105,225	29,434	16,915	339	804	319,838
\$	247,220	861,805	2,135,871	1,480,965	604,197	208,495	27,649	15,299	5,581,501
1931.....M	5,476	41,177	77,135	81,930	20,149	8,688	335	2,253	237,143
\$	116,316	619,357	1,752,947	1,205,464	423,357	107,213	20,773	43,692	4,289,119
1932.....M	6,188	12,801	30,197	40,753	5,522	4,248	125	643	100,477
\$	108,582	182,372	664,756	638,922	119,547	46,762	6,237	12,156	1,779,334
1933.....M	2,482	12,389	19,602	23,894	4,544	3,916	630	243	67,700
\$	41,737	156,769	412,367	356,498	101,252	44,377	7,824	3,693	1,124,517
1934.....M	4,904	14,256	23,800	30,317	6,005	6,440	43	307	86,072
\$	76,247	183,585	494,341	424,131	130,392	66,616	2,625	5,992	1,383,929
1935.....M	6,695	21,197	25,289	32,334	8,454	6,381	13	175	100,538
\$	122,215	259,504	500,066	437,123	175,042	55,253	728	5,236	1,555,167
1936.....M	6,097	24,180	30,218	35,592	8,961	10,241	25	418	115,732
\$	111,378	302,690	575,765	484,078	165,924	100,785	1,374	6,778	1,748,772

Table 374.—Production of Paving Brick in Canada, 1923-1936

(For years 1897 to 1922 see previous reports)

Year	Quantity	Value
	M	\$
1923-25.....		
1926.....	122	5,015
1927.....	50	2,106
1928.....	338	4,464
1929.....	97	3,844
1930.....	9	297
1931.....	19	682
1932.....	6	155
1933.....	1	42
1934.....	10	382
1935.....	15	627
1936.....	*116	3,149

*100 M in Alberta and 16 M in British Columbia.

Table 375.—Production of Structural Tile in Canada, by Provinces, 1936

Province	Hollow blocks*		Roofing tile		Floor tile (quarries)	
	Tons	\$	No.	\$	Sq. ft.	\$
Nova Scotia.....	4,058	39,990				
New Brunswick.....	332	2,828				
Quebec.....	16,786	135,144				
Ontario.....	30,085	223,545	43,600	1,856	95,540	13,484
Manitoba.....	377	3,903				
Saskatchewan.....	500	5,100				
Alberta.....	3,022	24,504				
British Columbia.....	3,341	32,846	9,130	283	2,198	314
Canada.....	1936	58,501	467,860	52,730	2,139	97,738
	1935	47,195	344,608	82,015	3,669	51,765
	1934	31,136	244,122	44,115	1,852	80,356

*Includes fireproofing and load-bearing tile.

Table 376.—Production of Sewer Pipe, Copings, Flue Linings, etc., in Canada, 1927-1936

(For the years 1888 to 1926 see Mineral Production of Canada, 1928)

Year	Tons	Value	Year	Tons	Value
		\$			\$
1927.....	77,262	1,475,875	1932.....		813,224
1928.....		1,729,644	1933.....		354,458
1929.....		2,005,887	1934.....		430,433
1930.....		1,721,815	1935.....		481,559
1931.....		1,508,803	1936.....		588,485

Table 377.—Production of Drain Tile in Canada, 1927-1936

Year	Quantity	Value	Year	Quantity	Value
	M	\$		M	\$
1927.....	22,259	598,098	1932.....	7,385	186,670
1928.....	22,629	656,054	1933.....	10,057	222,829
1929.....	25,000	720,316	1934.....	7,325	180,553
1930.....	25,291	687,070	1935.....	7,124	205,336
1931.....	12,518	328,410	1936.....	8,148	214,590

Table 378.—Production of Drain Tile and Sewer Pipe, in Canada, by Provinces, 1935 and 1936

Province	1935			1936		
	Drain tile		†Sewer pipe	Drain tile		†Sewer pipe
	M	\$	\$	M	\$	\$
Nova Scotia.....	729	33,539	146,962	135	3,676	230,130
New Brunswick.....	4	160		771	35,392	
Quebec.....	540	15,895	49,449	438	13,714	26,659
Ontario.....	5,061	125,593	196,647	6,000	131,041	235,238
Manitoba.....	69	3,546		64	3,691	
Saskatchewan.....						
Saskatchewan.....						
Alberta.....	52	2,176	63,600	27	1,751	67,604
British Columbia.....	669	24,427	24,901	713	25,325	28,854
Canada.....	7,124	205,336	481,559	8,148	214,590	588,485

† Includes copings, flue linings, etc.

Table 379.—Production of Pottery from Domestic Clays in Canada, 1927-1936

(For the years 1886 to 1926 see Mineral Production of Canada, 1928)

Year		Year	
Value		Value	
\$		\$	
1927.....	307,057	1932.....	244,861
1928.....	356,093	1933.....	202,500
1929.....	323,194	1934.....	223,733
1930.....	294,866	1935.....	220,711
1931.....	257,125	1936.....	218,402

Table 380.—Production (Sales) of Pottery from Domestic Clays, by Provinces, 1935 and 1936

Province	1935	1936
	\$	\$
New Brunswick.....	28,555	29,529
Ontario.....	50,000	51,507
Alberta.....	138,648	134,491
British Columbia.....	3,508	2,875
Canada.....	220,711	218,402

Table 381.—Production of Kaolin* and Fireclay in Canada, 1927-1936

Year	Kaolin		Fireclay		Year	Kaolin		Fireclay	
	Quantity	Value	Quantity	Value		Quantity	Value	Quantity	Value
	Tons	\$	Tons	\$		Tons	\$	Tons	\$
1927.....	24	120	5,070	35,961	1932.....			990	11,826
1928.....	5	25	5,123	35,284	1933.....			1,421	11,273
1929.....			5,041	35,226	1934.....	48	504	1,043	12,598
1930.....			2,870	25,975	1935.....	170	1,520	2,272	15,574
1931.....			1,233	14,857	1936.....			2,437	17,639

* Produced in Province of Quebec.

Table 382.—Production of Firebrick and Fireclay Blocks and Shapes in Canada, from Domestic Clays, 1927-1936

(For the years 1907 to 1926 see Mineral Production of Canada, 1928)

Year	Firebrick		Fireclay blocks and shapes	Year	Firebrick		Fireclay blocks and shapes
	Quantity	Value	Value		Quantity	Value	Value
	M	\$	\$		M	\$	\$
1927.....	3,588	246,266	100,659	1932.....	1,580	71,757	75,209
1928.....	4,919	234,460	105,091	1933.....	1,547	73,226	80,625
1929.....	5,196	251,043	130,411	1934.....	2,109	101,219	62,388
1930.....	3,789	177,608	147,309	1935.....	1,817	90,149	71,344
1931.....	2,248	107,597	83,039	1936.....	2,548	118,923	65,171

Table 383.—Production (Sales) of Fireclay Blocks and Shapes and Firebrick, by Provinces, 1936

Province	Fireclay*		Fireclay blocks and shapes	Firebrick	
	Tons	\$	\$	M	\$
Nova Scotia.....	1,214	3,902	471	6	210
New Brunswick.....	35	1,415	894		
Saskatchewan.....	621	4,665	46,968	395	19,676
Alberta.....				14	755
British Columbia.....	567	7,657	16,838	2,133	98,282
Canada.....	1936	2,437	17,639	2,548	118,923
	1935	2,272	15,574	1,817	90,149

* Does not include the entire quantity of clay shipped from Saskatchewan to Alberta for the manufacture of clay products.

Table 384.—Fullers' Earth Used in Canada in the Manufacture of Soaps and Washing Compounds and in the Petroleum Products Industry, 1930-1936

Year	Petroleum products industry		Soaps and washing compounds	
	Pounds(*)	Value	Pounds	Value
		\$		\$
1930.....	20,102,387	241,793	Data not available	
1931.....	16,157,582	201,361	492,174	6,264
1932.....	19,642,179	258,934	507,807	7,444
1933.....	22,811,655	314,515	588,434	8,501
1934.....	18,588,514	239,357	508,316	6,562
1935.....	18,487,148	260,885	660,018	13,694
1936.....	18,907,295	243,164	1,328,219	20,601

(*) Includes all clay.

Table 385.—China Clay (Kaolin) Used in the Manufacture of Paper in Canada, 1930-1936

Year	Tons	Value	Year	Tons	Value
		\$			\$
1930.....	13,024	218,423	1934.....	27,550	357,286
1931.....	11,484	173,660	1935.....	33,766	442,584
1932.....	14,432	205,068	1936.....	39,165	520,121
1933.....	20,048	267,014			

Table 386.—Firebrick and Fireclay Used in the Manufacture of Iron and Steel and Their Products in Canada, 1931-1935

Year	Firebrick		Fireclay		Other fireclay, firebrick and cupola blocks
	Number	Value	Tons	Value	
		\$		\$	\$
1931.....	4,326,000	197,684	7,631	64,300	45,393
1932.....	3,409,000	123,532	5,910	52,492	36,395
1933.....	1,846,016	141,784	7,615	62,602	(b) 11,628
1934.....	2,590,452	192,538	8,248	75,906	21,488
1935.....	(a)	451,604	11,510	101,601	28,064

(a) Not available. (b) From 1933 includes only cupola blocks.

Table 387.—Clays and Earths Used in Canadian Rubber Industry, 1933-1936

Year	Tons	Value \$
1933.....	1,391	32,361
1934.....	2,391	54,368
1935.....	2,639	63,553
1936.....	3,067	70,700

Table 388.—Imports into Canada and Exports of Clay and Clay Products, 1935 and 1936

	1935		1936	
	Quantity	\$	Quantity	\$
IMPORTS—				
Building brick.....	570	8,519	2,544	24,310
Building blocks and fireproofing tile.....		3,209		7,274
Clays—China.....	708,890	287,997	833,807	342,654
Fire.....	993,947	156,361	1,398,931	192,640
Pipe.....		6,489		2,793
Other clays, n.o.p.....		258,044		238,159
Zirconium silicate.....		2,307		2,547
Zirconium oxide.....		13,824		23,133
Drain tile, unglazed.....		11		22
Drain, sewer pipe and earthenware fittings therefor, chimney linings or vents, chimney tops or inverted blocks, glazed or unglazed, n.o.p.....		8,219		15,297
Tiles or blocks of earthenware or stone prepared for mosaic flooring.....		28,890		46,377
Tiles, earthenware, for roofing purposes.....		3,607		6,120
Insulators, electric, porcelain.....		99,318		132,305
Pottery and chinaware.....		63,428		67,596
Brick, fire, other, valued at not less than \$100 per M, rectangular shaped; the dimensions of each not to exceed 125 cubic inches; for use exclusively in the construction or repair of a furnace, kiln, etc.....		3,363,970		3,672,867
Brick, fire, n.o.p., for use exclusively in the construction or repair of a furnace, kiln, or other equipment of a manufacturing establishment (not made in Canada).....		110,863		93,293
Firebrick, n.o.p.....		492,961		357,733
Firebrick, chrome.....		224,735		608,749
Magnesite brick (fire).....		46,882		68,082
Silica brick (containing not less than 90 per cent silica).....		384,141		568,565
Paving brick.....		215,500		261,974
Artificial teeth, not mounted.....	2,505	18,787	1,216	11,122
Baths, bathtubs, basins, laundry tubs, etc., of earthenware, cement or clay, n.o.p.....		306,922		337,252
Ceramic insulator cores, not further manufactured than burned and glazed, printed or decorated or not, and without fittings, when imported by manufactures of spark plugs for use exclusively in the manufacture of spark plugs in their own factories (*).....		85,350		90,614
Crucibles, clay or sand.....		130,069		54,516
Other manufactures of clay, n.o.p.....		44,526		54,162
		73,053		70,992
Total.....		6,438,042		7,351,148
From—United Kingdom.....		3,056,670		3,573,639
United States.....		2,619,038		3,110,926
EXPORTS—				
Building brick.....	M 367	6,784	666	11,590
Clay—Unmanufactured.....	5,591	2,595	3,297	2,600
Manufactures of.....		15,502		36,803
Earthenware.....		49,843		82,936
Porcelain insulators.....		288,440		392,927
Total.....		363,164		526,856

(*) To April 30th, 1936. Cwt.=100 pounds. Ton=2,000 pounds.

***Prices.**—Bentonite, per ton, carload lots, f.o.b. Wyoming mines, dried and crushed, in bulk, \$8; in bags, \$10; f.o.b. Chicago, selected air-floated, \$25.

China Clay (Kaolin), per ton, f.o.b. South Carolina and Georgia mines, in bulk: crushed, pulverized or air-floated, \$6.50 to \$7.50; water-washed, \$7.50 to \$8.50. In 50 pound paper bags, \$2.50 per ton extra. Florida: washed and crushed, super white, \$11.75; super-plastic, \$11.75; both grades in paper bags, \$14 to \$15. Air-floated, \$14 to \$21. Maryland: ball clays, shredded

(*) Engineering and Mining Journal's "Meta land Mineral Markets"—New York.

bulk, \$3.75 to \$8.25; air-floated, in paper bags, \$15 to \$18.25. New Jersey: plastic kaolin, pulverized, in paper bags, \$10. Insecticide clay, \$11.50 to \$16.50. Imported English, per long ton, f.o.b. American ports: lump, \$20.00 to \$25.00 in bulk; air-floated, \$35 to \$60.

Fuller's Earth, per ton, f.o.b. Colorado, \$9. F.O.B. Georgia or Florida, 30 to 60 mesh, \$14.50; 15 to 30, \$14; 200 and up, \$10; 100 and up \$7. F.O.B. California, ground, \$17 to \$21.

†Fuller's Earth, English, carlots—ton—to \$32.00; Georgian, carlots, to \$19.00.

†China Clay, imported, car lots—bulk—ton \$11 to \$20. Pigment clay for rubber—car lots—bags, ton, to \$16, less car lots, to \$23.

(†) "Canadian Chemistry and Metallurgy"—Toronto.

Table 389.—World Production of China Clay, 1934-1936

(Supplied by Imperial Institute)

(Long tons)

Producing country and description	1934	1935	1936
BRITISH EMPIRE			
United Kingdom.....	690,129	707,572	746,922
Union of South Africa.....	369	226	344
Canada.....	43	152	.....
Federated Malay States.....	164	91	121
India.....	20,562	14,435	18,005
Unfederated Malay States.....	142	5	.....
Australia.....	12,078	14,661	(a)
FOREIGN COUNTRIES			
Austria.....	13,572	19,400	(a)
Belgium (e).....	14,291	15,363	18,848
Bulgaria.....	6,181	5,271	1,892
Czechoslovakia (estimated).....	350,000	350,000	400,000
Denmark—			
Crude.....	42,400	34,900	27,700
Washed and pressed.....	11,200	9,800	8,500
Dried.....	700	.....	.....
France.....	134,100	110,500	(a)
Germany—			
Bavaria.....	677,287	657,205	141,913
Prussia.....	61,793	68,074	76,795
Saxony—			
Crude.....	35,940	47,622	45,855
Washed.....	43,054	44,101	50,298
Sand.....	10,114	(a)	(a)
Thuringia—			
Sand.....	(a)	(a)	5,018
Italy—			
Crude.....	37,233	66,195	109,311
Washed and ground (c).....	4,452	5,000	(a)
Kaolinic earth.....	(a)	1,500	(a)
Portugal—			
Washed.....	11,278	13,236	11,442
Kaolinic sand.....	366	340	384
Roumania (d).....	14,546	13,288	(a)
Spain (g).....	1,348	(a)	(a)
Sweden.....	2,337	2,712	2,668
Algeria.....	1,523	1,253	2,570
United States (f).....	380,656	467,550	570,481
Argentina.....	45	604	426
Chile.....	7,009	6,807	(a)
China (b).....	792,000	(a)	(a)
Japan (estimated).....	400,000	400,000	400,000
Korea.....	23,051	32,873	24,322
"Manchoukuo".....	160,000	(a)	(a)
Netherlands East Indies.....	.....	12	9

China clay is also produced in U.S.S.R. (Russia).

(a) Information not available.

(b) Includes fireclay.

(c) Derived from crude and stocks.

(d) Converted from cubic metres at the rate of 1 cubic metre=2 long tons.

(e) "Eurite" and kaolin.

(f) Sales of china clay and paper clay.

(g) 4,540 cubic metres of kaolinic sand were also produced in quarries during 1934.

2. Products from Imported Clays

A number of factories in Canada manufacture ceramic products from clays which they import chiefly from England and the United States. Firebrick, refractory cements, sanitary earthenware, porcelain insulators, floor and wall tile, pottery, tableware and sewer pipe were the principal products made in these works.

In 1936 there were 20 factories of this kind in operation, the same number as in 1935, but output advanced 33 per cent in value to \$2,906,432 from \$2,174,977 in the previous year. Capital employed amounted to \$4,216,334 and the average number of workers was 1,079. Salaries and wages amounted to \$1,001,047, materials for manufacturing cost \$708,576, and fuel and electricity cost \$214,762.

Table 390.—Products Made in the Imported-Clay Products Industry, 1935 and 1936

Products	1935	1936
	Gross selling value at works	Gross selling value at works
	\$	\$
Firebrick and stove linings—Rigid.....	291,059	330,602
Plastic.....	43,256	59,618
High tension insulators, sanitary earthenware, clay sewer pipe, floor and wall tile, tanks, pottery, tableware, etc. (Separate figures cannot be shown for these items as there were only one or two producers in each case).....	1,840,662	2,516,212
Total.....	2,174,977	2,906,432

NOTE.—Firebrick, floor tile, sewer pipe and pottery are also made in Canada from domestic clays.

Table 391.—Materials Used in the Imported-Clay Products Industry, 1935 and 1936

Materials	1935		1936	
	Quantity	Cost at works	Quantity	Cost at works
		\$		\$
Feldspar, ground.....ton	1,135	21,977	1,572	28,521
Fireclay, imported.....ton	11,475	66,698	10,635	61,999
Other clay, imported.....ton	14,907	129,484	18,979	167,944
Silica, ground.....ton	1,448	20,212	2,305	26,722
Glazing materials, other.....\$		10,695		11,596
Hardware for insulators.....\$		135,325		117,663
Containers and packing materials.....\$		34,215		59,797
All other materials.....\$		112,129		234,334
Total.....\$		530,735		708,576

LIME

Sales of lime in 1936 by Canadian producers, including both quick and hydrated, and inclusive of lime used by the producers themselves, amounted to 468,401 short tons valued at \$3,335,970 compared with 405,419 short tons worth \$2,925,791 in 1935. Of the 1936 output, 391,499 tons valued at \$2,789,972 comprised quicklime and 76,902 tons at \$545,998 represented production of the material in the hydrated form. Ontario and Quebec are Canada's two principal lime producing provinces; production in the province first referred to totalled 246,593 short tons valued at \$1,946,060 during 1936 while that in Quebec, in the same period, amounted to 133,254 short tons appraised at \$718,585. Canadian producers received an average of \$7.13 per ton for quicklime and \$7.10 for hydrated lime in 1936 compared with \$7.09 and \$7.90, respectively, in 1935.

Producers' sales of lime for chemical purposes in 1936 totalled 389,324 short tons valued at \$2,670,266 as contrasted with only 79,077 short tons at \$665,704 for building and other non-chemical uses; of the material produced for chemical purposes, 349,940 short tons consisted of quicklime and 39,384 tons of hydrated lime.

The production of lime in 1936 for chemical purposes was 49 per cent greater in quantity and 50 per cent higher in value than that sold or consumed for similar use in 1935.

The pulp and paper industry is one of the largest consumers of lime for chemical purposes; the quantity of quicklime sales to this industry in 1936 was reported by Canadian lime producers at 87,990 short tons valued at \$506,810; hydrated lime shipped to pulp and paper plants during

the same period totalled 28,805 short tons worth \$112,809. Other of the larger consignments of producers of lime included 34,704 short tons valued at \$242,593 to iron and steel mills; 40,764 short tons valued at \$302,291 to gold mines; 45,129 short tons at \$447,384 as finishing and masons' lime; 6,377 short tons valued at \$44,310 to glass works, and 7,248 short tons at \$45,386 for the manufacture of sand-lime brick.

Statistics obtained during the census of 1871 show 1,010 lime kilns in operation in Canada. These kilns were located in Nova Scotia, New Brunswick, Quebec and Ontario. Capital invested in plant and equipment as recorded during that year was \$128,508, and employees numbered 2,042 earning \$157,943; the value of lime produced was \$502,156. Canadian lime production reached its highest in 1929 when shipments of 674,087 short tons valued at \$5,908,610 were reached.

In 1936 Canadian producers of lime totalled 52 of which 21 were located in Quebec, 16 in Ontario, 2 in Nova Scotia, 4 in New Brunswick, and 3 in each of the following provinces—Manitoba, Alberta and British Columbia. Capital employed in the industry during 1936 was reported at \$6,106,901; employees totalled 799 and \$640,322 was distributed as salaries and wages. Fuel and purchased electricity consumed during 1936 was valued at \$743,663 and included \$178,648 for 32,960 tons of Canadian bituminous coal, \$282,908 for 53,904 tons of imported bituminous coal, \$81,857 for 11,532 tons of coke, \$120,072 for 40,341 cords of wood, and \$21,420 for fuel oil.

"The lime industry has recently made notable advances in the technology of lime burning and in the variety of products marketed. Research has shown that the temperature and time of calcination have an important bearing on the properties of lime and much greater attention is now being paid to these factors. Refractories for kiln linings are also being studied; vertical kilns have been designed that are almost automatic in operation. The chemical industries are now demanding quicklime in pebble size, in the form of crushed lime, and also finely pulverized, the last two products being packed in multi-walled paper bags with a ply of cellophane or asphalt paper to make the bags air-tight. Dead-burned dolomite for use in glassmaking and as a refractory material, and lightly burned dolomite for use in water treatment are also being marketed though high-calcium lime is usually specified for the latter purpose. Developments in the production of hydrated lime have been mostly in the improvement of plasticity by control of the burning and hydration processes, and also in the production of more plastic hydrates by the addition of certain materials during the hydration process. Hydrated lime is marketed in 50 pound multi-walled bags for industrial use and in small cartons for household use. The possibilities of utilizing carbon dioxide gas from limekilns for the manufacture of liquid carbon dioxide and solid carbon dioxide (dry ice) are being carefully considered and several lime plants both in the United States and in Germany have installed equipment for this purpose. Increased utilization of precipitated calcium carbonate as a filler for book and magazine papers as well as dentifrices and medicines is also of interest to producers of lime. Several lime plants now manufacture precipitated calcium carbonate by recarbonating milk of lime."—(M. F. Goudge, Bureau of Mines, Ottawa.)

Table 392.—Capital Employed in the Lime Industry in Canada, by Provinces, 1936

Province	Capital employed as represented by:					Total
	Present cash value of land	Present value of buildings, fixtures, machinery, tools and other equipment	Inventory value of stone on hand, fuel and miscellaneous supplies on hand	Inventory value of finished products on hand	Operating capital (cash bills and accounts receivable prepaid expenses, etc.)	
	\$	\$	\$	\$	\$	\$
New Brunswick*	116,241	96,300	10,810	8,793	30,890	263,034
Quebec	388,145	1,023,102	64,756	55,786	151,123	1,682,912
Ontario	987,682	1,252,224	161,061	8,218	25,520	2,434,705
Manitoba	50,000	948,355	16,640	10,177	65,121	1,090,293
Alberta	25,000	141,302	4,890	5,418	29,207	205,817
British Columbia	7,430	328,687	33,299	11,345	49,379	430,140
Canada	1,574,498	3,789,970	291,456	99,737	351,240	6,106,901

*Includes data for 2 firms in Nova Scotia.

Table 393.—Employees, Salaries and Wages in the Lime Industry in Canada, by Provinces, 1936

Province	*Average number of employees			Salaries and wages		
	Salaried employees	Wage-earners	Total	Salaries	Wages	Total
				\$	\$	\$
New Brunswick†.....	10	111	121	16,322	87,209	103,531
Quebec.....	21	241	262	25,972	173,606	199,578
Ontario.....	19	211	230	26,767	188,444	215,211
Manitoba.....	6	73	79	9,280	43,785	53,065
Alberta.....	4	20	24	3,495	21,074	24,569
British Columbia.....	13	70	83	8,452	35,916	44,368
Canada.....	73	726	799	90,288	550,034	640,322

*See note, page 28.

†Includes data for 2 firms in Nova Scotia.

Table 394.—Number of Wage-earners on Payroll or Time Record on the 15th of Each Month or Nearest Representative Date, 1936

Month	Quarry	Kiln	Month	Quarry	Kiln
January.....	240	363	July.....	306	493
February.....	240	354	August.....	293	465
March.....	254	376	September.....	293	463
April.....	281	428	October.....	308	489
May.....	293	477	November.....	273	475
June.....	318	509	December.....	263	422

Table 395.—Production of Lime in Canada, 1927-1936

(For the years 1886 to 1926 see Mineral Production of Canada, 1928)

Year	Tons	Value	Year	Tons	Value
		\$			\$
1927.....	444,753	3,923,388	1932.....	320,650	2,394,537
1928.....	508,889	4,534,568	1933.....	323,540	2,432,306
1929.....	674,087	5,908,610	1934.....	368,113	2,745,797
1930.....	490,802	4,038,698	1935.....	405,419	2,925,791
1931.....	344,785	2,764,415	1936.....	468,401	3,335,970

Table 396.—Production of Lime in Canada, by Provinces, 1934-1936

Province	Quicklime		Hydrated lime		Total		
	Sold or used		Sold or used		Sold or used		
	Tons	Value	Tons	Value	Tons	Value	
		\$		\$		\$	
Nova Scotia.....	1934	8,298	63,630	622	4,324	8,920	67,954
	1935	10,998	80,408	333	2,290	11,331	82,698
	1936	15,163	113,569	501	5,661	15,664	119,230
New Brunswick.....	1934	8,949	76,132	6,803	50,277	15,752	126,409
	1935	9,569	74,721	6,703	50,054	16,272	124,775
	1936	11,004	80,173	6,838	47,843	17,842	128,016
Quebec.....	1934	85,106	510,614	23,584	121,370	108,690	631,984
	1935	91,086	545,956	25,387	132,910	116,473	678,866
	1936	99,311	592,833	33,943	125,752	133,254	718,585
Ontario.....	1934	168,760	1,287,251	22,281	249,038	191,041	1,536,289
	1935	196,761	1,470,721	23,379	226,146	220,140	1,696,867
	1936	219,943	1,674,851	26,650	271,209	246,593	1,946,060
Manitoba.....	1934	12,988	100,958	3,580	62,650	16,568	163,608
	1935	14,594	115,149	4,021	70,368	18,615	185,517
	1936	17,314	133,227	4,446	77,808	21,760	211,035
Alberta.....	1934	7,300	64,143	155	1,554	7,455	65,697
	1935	6,354	54,803	230	2,305	6,584	57,108
	1936	8,879	75,756	250	2,503	9,129	78,259
British Columbia.....	1934	16,721	135,528	2,966	18,328	19,687	153,856
	1935	12,685	83,664	3,319	16,296	16,004	99,960
	1936	19,885	119,563	4,274	15,222	24,159	134,785
Canada.....	1934	308,122	2,238,256	59,991	507,541	368,113	2,745,797
	1935	342,047	2,425,422	63,372	500,369	405,419	2,925,791
	1936	391,499	2,789,972	76,902	545,998	468,401	3,335,970

Table 397.—Production of Lime in Canada, by Provinces, 1936, showing Purposes for which Used* or Sold

(1 ton = 2,000 pounds)

	Nova Scotia and New Brunswick	Quebec	Ontario	Manitoba and Alberta	British Columbia	Canada
QUICKLIME						
Building trades—						
Finishing lime.....ton		141	216	1,613		1,970
\$		1,380	1,726	16,034		19,140
Masons' lime.....ton		809	10,083	478		14,999
\$		6,353	69,150	4,225		112,945
Sand-lime brick.....ton		891	6,357			7,248
\$		3,712	41,674			45,386
Agriculture.....ton		930	199			1,129
\$		4,844	1,141			5,985
Chemical—						
Smelters.....ton		1,638	544	799		2,981
\$		15,639	3,418	7,988		27,045
Iron and steel mills (a).....ton		241	10,520	4,397	605	31,386
\$		117,469	74,757	35,179	2,807	232,344
Cyanide mills (gold mines).....ton		50	28,040	1,057		29,951
\$		510	201,655	12,775	7,177	222,117
Pulp and paper mills.....ton		7,199	54,244	9,570	11,605	87,990
\$		52,168	280,958	32,555	63,442	506,810
Glass works.....ton			6,268	109		6,377
\$			43,332	6,978		44,310
Sugar refineries.....ton		225	7,780	6,424		14,438
\$		1,750	65,155	51,392		118,364
Tanneries.....ton			3,162			3,534
\$			22,251			25,962
Fertilizers.....ton			367			367
\$			2,569			2,569
Insecticides.....ton			970			970
\$			6,790			6,790
Other chemical works.....ton		33,767	138,028	151		171,946
\$		218,892	1,092,611	1,260		1,312,763
Dealers—Uses unspecified.....ton		1,331	3,323	1,305	6,871	13,907
\$		10,648	25,733	8,009	12,180	58,462
Other consumers.....ton			1,056	290	31,892	2,306
\$			7,392	8,058	3,530	18,980
Total quicklime.....ton	26,167	99,311	219,943	26,193	19,885	391,499
\$	193,742	592,833	1,674,851	208,983	119,563	2,789,972
HYDRATED LIME						
Building trades—						
Finishing lime.....ton	12	5	16,322	4,573		20,912
\$	135	50	180,781	78,163		259,129
Masons' lime.....ton	318	393	6,537			7,248
\$	3,064	1,982	51,124			56,170
Sand-lime brick.....ton						
\$						
Agriculture.....ton	530	807	1,198		2,370	4,905
\$	4,750	4,985	11,878		8,435	30,048
Chemical—						
Smelters.....ton		480	118		480	1,078
\$		2,715	1,216		1,708	5,639
Iron and steel mills.....ton		3,306	12			3,318
\$		10,123	126			10,249
Cyanide mills.....ton		3,033				3,033
\$		15,019				15,019
Pulp and paper mills.....ton	5,700	22,126	939		40	28,805
\$	38,000	65,134	9,532		143	112,809
Glass works.....ton						
\$						
Sugar refineries.....ton	10	396				406
\$	90	2,079				2,169
Tanneries.....ton		319	266			585
\$		2,259	2,793			5,052
Fertilizers.....ton		110	40			150
\$		660	420			1,080
Insecticides.....ton	398					398
\$	4,497					4,497
Other chemical works.....ton		804	774	33		1,611
\$		6,034	8,067	577		14,678
Dealers—Uses unspecified.....ton	371	1,233	98		1,384	3,086
\$	2,968	10,052	1,072		4,936	19,028
Other consumers.....ton		931	346	90		1,367
\$		4,660	4,200	1,571		10,431
Total hydrated lime.....ton	7,339	33,943	26,650	4,696	4,274	76,902
\$	53,504	125,752	271,209	80,311	15,222	545,998
Grand total.....ton	33,506	133,254	246,593	30,889	24,159	468,401
\$	247,246	718,585	1,946,060	289,294	134,785	3,335,970

(a) Includes calcined dolomite used as a refractory material.

(*) Not necessarily consumed in provinces where produced.

Table 398.—Lime Sold or Used for Chemical and Other Purposes and Value of Contracts Awarded in Canada, 1931-1936

Year	Lime sold or used for chemical purposes		Lime sold or used for building or other non-chemical purposes		Value of construction contracts awarded in Canada (a)
	Tons	Value	Tons	Value	
		\$		\$	\$
1931.....	231,837	1,637,319	112,948	1,127,096	315,482,000
1932.....	255,472	1,758,898	65,178	635,639	132,872,400
1933.....	235,810	1,664,946	87,730	767,360	97,289,800
1934.....	229,906	1,598,906	138,207	1,146,891	125,811,500
1935.....	260,885	1,775,657	144,534	1,150,134	160,305,000
1936.....	*389,324	2,670,266	79,077	665,704	162,588,000

(a) Compiled by McLean Building Reports Ltd.

*349,940 short tons quicklime; 39,384 short tons hydrated lime.

Table 399.—Imports into Canada and Exports of Lime and Various Lime Compounds, 1935 and 1936

	1935		1936	
	Quantity	Value	Quantity	Value
		\$		\$
IMPORTS—				
Lime.....	cwt.	12,706	9,181	18,763
Calcium chloride in packages of not less than 25 pounds.....	lb.	924,700	8,163	638,400
Calcium chloride in packages of less than 25 pounds.....	lb.	652	175	197
Calcium chloride not in solution for road treating purposes.....	lb.	28,019,000	268,410	24,053,800
Calcium arsenate.....	lb.	144,023	7,786	276,552
Chloride of lime and hypochlorite of lime in packages not less than 25 pounds.....	lb.	3,413,900	61,371	1,010,100
Chloride of lime and hypochlorite of lime in packages of less than 25 pounds.....	lb.	47,229	5,781	46,654
EXPORTS—				
Lime.....	cwt.	104,598	50,296	233,328
Acetate of lime.....	cwt.	27,433	45,570	63,550

SAND AND GRAVEL

Commercial production of sand and gravel in Canada during 1936, including that obtained by dredging, totalled 22,124,160 short tons valued at \$6,921,399. The 1936 output of these materials represents an increase of 4.3 per cent in tonnage and 8.3 per cent in value over that of the preceding year and was the greatest annual production since 1930.

Of the total quantity of sand and gravel produced in 1936, 38.41 per cent came from properties located in Ontario, 24.82 per cent from Quebec, 8.50 per cent from Nova Scotia, 8.37 per cent from Manitoba, and 7.92 per cent from British Columbia; lesser quantities were recorded for New Brunswick, Saskatchewan, Alberta, and Prince Edward Island.

In 1936, shipments of screened or washed sand and gravel totalled 3,254,222 short tons compared with corresponding shipments of 9,069,464 short tons in 1935. Production of bank or pit-run material in 1936 amounted to 18,869,938 short tons, or an increase of 55.4 per cent above the output of similar products in the preceding year.

During the year under review, 6,318,681 short tons of sand and gravel were utilized as railway ballast and 14,336,640 short tons consumed in concrete and highway construction. In the same period producers' shipments of moulding and core sands amounted to 17,686 short tons valued at \$18,408, while production of "straight" sand, washed and pit-run, for building and various other purposes totalled 970,637 short tons worth \$366,880.

The number of operators reporting production of sand and gravel in 1936 totalled 1,356; capital employed amounted to \$2,994,127 and \$2,090,388 were distributed by the industry to 3,638 employees.

Imports of silica sand and silex (crystallized quartz) in 1936 amounted to 147,667 short tons valued at \$355,217 and in the same year imports of sand and gravel, n.o.p., totalled 121,937 short tons appraised at \$77,668. Exports of sand and gravel from Canada during 1936 totalled 333,438 short tons worth \$73,624 compared with 100,157 short tons at \$21,446 in 1935.

For several years past the Bureau of Mines, Ottawa, has been conducting a general investigation of the natural-bonded moulding sands of Canada, with particular reference to available data concerning all known deposits. A report, No. 767—Natural Bonded Moulding Sands of Canada—and a French edition, No. 768—Les Sables Naturels de Moulage au Canada—draw attention to the large number of deposits from which supplies have been used for local foundries, and to the probability of replacing imported material with Canadian sands. An investigation was started by the Bureau of Mines, Ottawa, on the possibility of producing artificial or synthetic moulding sands from selected sands and the plastic fireclays and bentonite of Canadian origin.

The following information is from the 1937 Minerals Yearbook of the United States Bureau of Mines—"Foster and Walker (National Sand and Gravel Association) reported the results of research on strength and wear tests of gravels and crushed-stone concrete. They concluded that the shape of the particles has little effect on strength, although rounded aggregates permit the use of a richer mortar because of the lower percentage of voids. Of particular interest was their finding that crushed stone rounded mechanically and used in concrete gave the same compressive and flexural strengths as angular crushed stone with the same cement content.

"Several companies are operating mixing plants to prepare material for so-called stabilized roads. Sand, gravel, and clay are mixed in the proper proportions with calcium chloride, sodium chloride, or possibly some other binding agent, and trucked to the job. This type of construction is becoming increasingly popular for low-cost secondary roads but probably does not afford a wide market for permanent plants, except under special conditions."

Table 400.—Capital Employed in the Sand and Gravel Industry in Canada, by Provinces, 1936

Province	Capital employed as represented by:					Total
	Present cash value of the land*	Present value of buildings, fixtures, machinery, tools and other equipment	Inventory value of materials on hand, stocks in process, fuel and miscellaneous supplies on hand	Inventory value of finished products on hand	Operating capital (cash, bills and accounts receivable, prepaid expenses, etc.)	
	\$	\$	\$	\$	\$	\$
Nova Scotia.....	(a)	(a)	(a)	(a)	(a)	(a)
New Brunswick.....	5,000					5,000
Quebec.....	191,800	143,564	39,377	14,628	22,894	412,263
Ontario.....	117,648	1,091,318	13,615	78,527	322,330	1,623,438
Manitoba.....	285,910	120,224	8,784	16,144	145,887	576,949
Saskatchewan.....	(a)	(a)	(a)	(a)	(a)	(a)
Alberta.....	500					500
British Columbia.....	139,120	204,559	5,000	6,075	21,223	375,977
Canada.....	739,978	1,559,665	66,776	115,374	512,334	2,994,127

*Excluding unmined material.

(a) Not available.

Table 401.—Employees, Salaries and Wages in the Sand and Gravel Industry, by Provinces, 1936

Province	*Average number of employees			Salaries and wages		
	Salaried employees	Wage-earners	Total	Salaries	Wages	Total
				\$	\$	\$
Nova Scotia†.....		435	435		469,583	469,583
New Brunswick.....		114	114		61,106	61,106
Quebec.....	14	1,420	1,434	18,026	718,797	736,823
Ontario.....	24	505	529	36,044	201,240	237,284
Manitoba.....		665	675	25,400	280,980	306,380
Saskatchewan.....		159	159		132,401	132,401
Alberta.....		152	152		48,190	48,190
British Columbia.....	18	122	140	24,117	74,504	98,621
Canada.....	66	3,572	3,638	103,587	1,986,801	2,090,388

*See note on page 28.

†Includes data for Prince Edward Island.

Table 402.—Number of Wage-Earners, by Months, 1934-1936

Month	1934	1935	1936
January.....	122	122	186
February.....	122	116	169
March.....	387	138	221
April.....	596	1,088	315
May.....	3,128	6,117	4,502
June.....	3,895	6,664	8,703
July.....	4,167	6,754	8,785
August.....	4,219	6,806	5,087
September.....	2,418	4,988	4,656
October.....	940	1,483	1,319
November.....	400	544	420
December.....	316	406	256

Table 403.—Production* of Sand and Gravel in Canada, 1927-1936

(For the years 1886 to 1926 see Mineral Production of Canada, 1928)

Year	Tons	Value	Year	Tons	Value
		\$			\$
1927.....	22,952,819	6,055,601	1932.....	14,469,942	4,480,596
1928.....	28,102,917	5,809,431	1933.....	11,738,823	4,464,285
1929.....	27,346,945	7,317,814	1934.....	14,854,159	4,035,477
1930.....	28,547,511	8,344,913	1935.....	21,213,489	6,389,440
1931.....	21,748,586	6,651,165	1936†.....	22,124,160	6,921,399

*Does not include production of natural silica sand or of silica sand manufactured from quartz or silica rock; production of these are recorded under quartz.

†Sand used for back filling at mines included.

Table 404.—Production in Canada, Imports and Exports of Sand and Gravel, 1935-1936

Kind	1935			1936		
	Washed or screened	Bank or pit-run	Total value	Washed or screened	Bank or pit-run	Total value
	Tons	Tons	\$	Tons	Tons	\$
PRODUCTION—						
Sand—						
Moulding sand.....	1,504	11,709	14,674	1,187	15,538	16,951
Building sand and sand for concrete, roadwork, etc..	545,402	242,010	264,435	552,691	403,811	362,542
Core sand.....	135	1,247	1,464	.....	961	1,457
Other sand (including blast and engine sands).....	4,014	38,686	9,145	2,328	11,807	4,338
Sand and gravel—						
Sand and gravel for railway ballast.....	42,484	2,224,711	415,092	202,162	6,116,519	1,054,703
Sand and gravel for concrete roads, etc.....	8,232,084	9,298,963	5,357,331	2,378,792	11,957,848	5,216,942
Crushed gravel.....	243,841	326,699	327,299	117,062	363,454	264,466
Total.....	9,069,464	12,144,025	6,389,440	3,254,222	18,869,938	6,921,399
	Tons		\$	Tons		\$
IMPORTS—						
Sand, silica, for glass and carborundum manufacture, etc.....	123,576		282,930	143,611		270,824
Sand and gravel, n.o.p.....	95,624		81,763	121,937		77,668
Total.....	222,200		364,693	265,548		348,492
EXPORTS.....	100,157		21,446	333,438		73,624

NOTE.—Production includes all classes of sand and gravel other than natural silica sand or silica sand manufactured from quartz or silica rock; production of these is recorded under quartz.

Table 405.—Production of Sand and Gravel in Canada, by Railway Operators, 1935-1936

Kind	1935		1936	
	Tons	Value	Tons	Value
		\$		\$
Sand—				
Moulding sand.....	831	271	1,000	136
Building sand and sand for concrete, roads, etc.....	34,238	6,431	8,857	1,648
Other sand (including blast and engine sands).....				
Sand and gravel—				
Sand and gravel for railway ballast.....	2,163,329	387,043	5,876,997	910,302
Sand and gravel for concrete, roads, etc.....	432,120	67,227	155,901	30,004
Crushed gravel.....				
Total.....	2,630,518	460,972	6,042,755	942,090

Table 406.—Production of Sand and Gravel in Canada, by Operators Other than Railways, 1935-1936

Kind	1935			1936		
	Washed or screened	Bank or pit-run	Value	Washed or screened	Bank or pit-run	Value
	Tons	Tons	\$	Tons	Tons	\$
Sand—						
Moulding sand.....	1,504	11,709	14,674	1,187	15,538	16,951
Building sand and sand for concrete, roads, etc.....	545,402	241,179	264,164	552,691	402,811	362,406
Core sand.....	135	1,247	1,464		961	1,457
Other sand (including blast, and engine sands).....	4,014	4,448	2,714	2,328	2,950	2,690
Sand and gravel—						
Sand and gravel for railway ballast.....	42,484	61,382	28,049	202,162	239,522	144,401
Sand and gravel for concrete, roads, mine filling, etc.....	8,232,084	8,866,843	5,290,104	2,378,792	11,801,947	5,186,938
Crushed gravel.....	243,841	326,699	327,299	117,062	363,454	264,466
Total.....	9,069,464	9,513,507	5,928,468	3,254,222	12,827,183	5,979,309

Table 407.—Production of Sand for Building and Concrete, Roads, Etc., and Sand and Gravel for Railway Ballast and for Concrete, Roads, Etc., 1932-1936

Year	SAND		SAND AND GRAVEL			
	For building, concrete, roads, etc.		For railway ballast		For concrete roads, etc.	
	Tons	Value	Tons	Value	Tons	Value
		\$		\$		\$
1932.....	2,368,304	745,091	2,097,224	324,648	9,604,113	3,181,105
1933.....	775,412	218,559	561,538	110,449	9,957,832	3,907,911
1934.....	686,631	209,002	1,454,618	266,292	12,418,408	3,411,751
1935.....	787,412	264,435	2,267,195	415,092	17,531,047	5,357,331
1936.....	956,506	362,542	6,318,681	1,054,703	14,336,640	5,216,942

NOTE.—For consumption of silica and silica sands see table 265, chapter 8.

Table 408.—Production of Sand and Gravel in Canada, by Provinces, 1935-1936

Kind	Nova Scotia	New Brunswick	Quebec	Ontario	Manitoba	Saskatchewan	Alberta	British Columbia
1935								
Sand—								
Moulding sand..... tons	30		10	12,804	369			
\$	75		20	14,225	354			
Building sand and sand for concrete, roadwork, etc..... tons		337	452,299	273,725	41,999		5,803	13,249
\$		62	158,073	87,343	12,362		2,411	4,184
Core sand..... tons				1,114	268			
\$				1,265	199			
Other sand (including blast sand, engine sand, etc.)..... tons		837	5,778	8,763		19,311	3,578	4,433
\$		155	1,086	3,158		3,576	662	508
Sand and gravel—								
Sand and gravel for railway ballast..... tons	67,459	122,572	335,705	517,655	523,601	156,966	325,972	217,265
\$	9,715	19,575	62,633	104,711	92,211	23,509	62,219	40,519
Sand and gravel for concrete, roads, etc..... tons	1,356,068	1,689,460	4,130,744	7,831,472	739,975	326,455	318,158	1,138,715
\$	676,183	826,189	1,006,369	1,919,533	273,775	144,085	80,800	430,397
Crushed gravel..... tons			344,451	124,584	93,447			8,058
\$			214,287	81,171	25,829			6,012
Total..... tons	1,423,557	1,813,206	5,268,987	8,770,117	1,399,659	502,732	653,511	1,381,720
\$	685,973	845,981	1,442,463	2,211,406	404,730	171,170	146,092	481,620
1936								
Sand—								
Moulding sand..... tons				15,765	960			
\$				16,303	648			
Building sand and sand for concrete, roadwork, etc..... tons	10,800	30,730	547,713	267,378	24,959	162	1,577	73,183
\$	4,000	5,663	201,804	119,294	10,793	120	628	20,240
Core sand..... tons				822	139			
\$				1,233	224			
Other sand (including blast sand, engine sand, etc.)..... tons		851	6,499	6,785				
\$		225	1,285	2,828				
Sand and gravel—								
*Sand and gravel for railway ballast..... tons	93,166	468,266	1,068,664	2,277,575	913,079	411,846	659,107	426,978
\$	15,235	99,813	205,199	400,662	132,989	53,546	89,856	57,403
*Sand and gravel for concrete, roads, mine filling, etc..... tons	1,843,505	471,098	3,583,735	5,819,635	844,642	204,902	233,696	1,235,427
\$	922,131	462,096	880,663	1,593,783	370,878	230,865	249,444	507,082
Crushed gravel..... tons			283,669	110,193	68,827			17,827
\$			129,280	93,517	29,598			12,071
Total..... tons	1,947,471	970,945	5,490,280	8,498,153	1,852,606	716,910	894,380	1,753,415
\$	941,366	567,797	1,418,231	2,227,620	545,130	284,531	339,928	596,796

* Includes 17,975 tons railway ballast valued at \$2,663 and 49,000 tons for concrete, road building, etc., valued at \$25,000—produced in Prince Edward Island.

SAND-LIME BRICK INDUSTRY

Only 5 factories in Canada manufactured sand-lime building brick during 1936; 4 were in Ontario and 1 in Quebec. The value of products made in these works, including brick, building blocks and some ready-mixed mortar, was \$189,668 in 1936 compared with \$154,950 for the 6 operating works in 1935.

Output of sand-lime brick in 1936 was reported at 11,456 thousand valued at \$119,707 at factory prices, an increase of 9 per cent in quantity but a slight decline in value when compared with the 1935 production of 10,522 thousand and \$120,307. Production of sand-lime building blocks increased to 573 thousand at \$55,411 from 259 thousand at \$31,581 in 1935.

The average number of employees in this industry during 1936 was 75, including 15 on salaries and 60 on wages. The number of wage-earners fluctuated from 29 in February to 98 in July, 64 in September, and 40 in December. Payments for salaries and wages totalled \$71,021 in 1936, as against \$58,700 in 1935.

Table 409.—Products, 1935 and 1936

Products	1935		1936	
	Quantity	Selling value at works	Quantity	Selling value at works
		\$		\$
Sand-lime brick..... M	10,522	120,307	11,456	119,707
Sand-lime building blocks..... M	259	31,581	573	55,411
Other products (*).....		3,062		14,550
Total		154,950		189,668

(*) Includes cinder blocks and ready-mixed concrete.

Table 410.—Materials Used in Manufacturing, 1935 and 1936

Materials	Unit of measure	1935		1936	
		Quantity	Cost at works	Quantity	Cost at works
		\$			\$
Quicklime.....	ton	3,247	25,763	3,853	32,512
Sand.....	cu. yd.	21,027	17,320	34,519	23,486
Total			43,083		55,998

THE STONE INDUSTRY IN CANADA

Including (1) the Stone Quarrying Industry and (2) the Monumental and Ornamental Stone Industry

The Stone Industry in Canada comprises two main divisions: (1) The Stone Quarrying Industry, including quarries and dressing works operated in conjunction with quarries, and (2) The Monumental and Ornamental Stone Industry, comprising the operations of firms having no quarries but who operate dressing works where stone for building and monumental purposes is cut, polished or otherwise finished. In the Census of Industry, statistics on the stone quarrying industry are included under mining, while statistics of the monumental and ornamental stone industry are included under manufactures. For convenience, this report carries data for both of these industries.

These two major divisions, constituting the Canadian stone industry, represented a capital investment of \$17,666,160 in 1936. Production during the year totalled \$6,404,307 which figure includes the value of the quarry output and the value added by manufacturing in the secondary stone industry. Salaried employees and wage-earners employed in 1936 numbered 3,757 and their combined earnings amounted to \$3,401,024.

The two industries are treated separately in the following review.

1. Primary Production—The Stone Quarrying Industry

The kinds of stone quarried in Canada include granite (trap rock, syenite and other igneous rock), limestone, marble, sandstone, and slate. Stone of almost every known variety occurs in Canada; rocks of the igneous areas of British Columbia, Manitoba, Ontario, Quebec and the Maritime Provinces exhibit a wide range of physical characteristics, some varieties being especially noted for their richness of colour and beauty of crystallization. The sedimentary rocks, including limestones, sandstones and marbles are quarried at various points in Canada. The products from quarries operating in these different formations not only yield high class structural and decorative materials but provide the chemical and other allied industries with many of their increasing requirements.

The combined shipments of limestone, granite, sandstone, marble and slate from Canadian quarries during 1936 totalled 4,982,912 short tons valued at \$5,134,153 compared with 4,317,947 short tons worth \$5,307,563 in 1935. Of the total Dominion stone production in 1936, Ontario contributed 2,706,680 short tons valued at \$2,398,456; Quebec, 1,514,052 short tons at \$1,729,367; British Columbia, 384,755 short tons at \$395,890, and Nova Scotia 254,572 short tons worth \$375,329; lesser quantities were shipped from properties operated in New Brunswick, Manitoba and Alberta. No commercial stone production was recorded in 1936 for Prince Edward Island, Saskatchewan or the Yukon and Northwest Territories.

During 1936 the relative quantities of stone shipped, by kinds, were as follows:—Limestone 74.89 per cent, granite 18.90 per cent, sandstone 5.73 per cent, marble 0.46 per cent and slate 0.02 per cent. Some of the larger shipments consigned in 1936 for specified purposes included 985,075 tons of limestone for concrete aggregate; 1,514,661 tons of limestone for road construction; 424,996 tons of granite for railroad ballast; 476,648 tons of various rocks for rubble and riprap; 197,957 tons of limestone and marble for the manufacture of pulp and paper; 279,299 tons of limestone for smelters and steel plants; 94,031 tons of limestone and marble for agricultural purposes and 42,335 tons of both igneous and sedimentary rocks for building purposes. In addition to the foregoing consumption of limestone there were 1,180,358 tons of this stone utilized in 1936 for the manufacture of cement and over 800,000 tons for the production of lime. The production of limestone and marble for chemical purposes has shown a continuous increase since 1932; shipments of these varieties of stone in 1936 for such use (exclusive of stone for the manufacture of cement and lime) totalled 615,207 short tons valued at \$553,597 compared with corresponding shipments of 226,966 tons at \$188,820 in 1932 and 537,799 tons at \$483,709 in 1935.

The number of firms reported as active in the Canadian stone industry during 1936 totalled 426 of which 21 were located in Nova Scotia, 7 in New Brunswick, 192 in Quebec, 169 in Ontario, 8 in Manitoba, 3 in Alberta and 26 in British Columbia.

Capital employed in the industry totalled \$11,899,852 in 1936; employees were recorded at 2,512 and salaries and wages paid amounted to \$2,043,216.

Canadian imports of stone of all kinds, together with certain manufactures of same, were appraised at \$856,242 in 1936 compared with a value of \$808,284 in 1935. Exports of stone from Canada in 1936 were valued at \$106,870 against \$110,969 in the preceding year.

Limestone surpasses any other rock or mineral in the number and diversity of its uses and in the quantity consumed for industrial purposes. The term "limestone" as employed in this report includes all varieties from high-calcium limestone, consisting almost entirely of the mineral calcite, to the highly magnesian variety, largely dolomite. The following information relating to limestone is from an article prepared by M. F. Goudge of the Department of Mines and Resources, Ottawa. "In the rock-wool industry—the newest of the limestone industries—siliceous and argillaceous dolomitic limestone, or calcium limestone, is converted into a light, fibrous insulating material known as "rock wool" which is being widely used as a thermal and sound insulation, and as an acoustical material. The process of manufacture consists in melting the limestone (which must contain sufficient silica and alumina to make it self-fluxing) to a fluid condition and then converting the melt into fine fibres by means of a blast of air or steam or by a mechanical device . . . The industries producing calcium carbide and calcium cyanamide use pure high-calcium limestone and coke as raw materials. In agriculture limestone plays a vitally important part for calcium is one of the elements essential to plant and animal life; the loss of lime compounds must be replaced if fertility of the soil is to be maintained and if the soil is to be prevented from becoming sour . . . it is now known that magnesia is a plant food and both magnesian limestone and calcium limestone are now used; in fact, magnesian limestone is preferred on soils that are known to be deficient in this element."

"Limestone is also used in the manufacture of many nitrogenous fertilizers and fertilizer materials such as cyanamide, calcium nitrate, ammonocitrophosphate, calcium ammonium nitrate and ammonium sulphate and is coming into wide use as a filler in chemical fertilizers where it has replaced inert fillers such as sand and loam . . . Pulverized high-calcium limestone is used as an ingredient in stock and poultry foods . . . Large quantities of limestone are used in the refining of beet sugar, the limestone being calcined at the refinery and both the lime and carbon dioxide

gas being utilized. Lime is also used in refining cane sugar . . . The metallurgical industry consumes vast quantities of limestone and lime. In the production of iron and steel, limestone is used as a flux in the blast furnace and both limestone and lime are used in the basic open-hearth process. Crushed dolomite, either raw or calcined, is used for patching and lining the floors of basic open-hearth furnaces. Lime and limestone are also used in foundry work both as flux and in dusting the surface of moulds . . . In the metallurgy of copper, lead, tin, nickel, gold, silver, cobalt, antimony, molybdenum and other metals, high-calcium limestone and lime find important applications . . . The pulp and paper industry utilizes large tonnages of both lime and limestone; in the manufacture of sulphite pulp, limestone either of the high-calcium or of the magnesian type is used in the Jensen tower of process, and dolomitic lime is used in the milk-of-lime process. High-calcium lime is required for making sulphate pulp, soda pulp and rag paper . . . In the rubber industry, whiting and whiting substitute, which latter is simply a finely pulverized high-calcium limestone or marble, are used for the compounding of a wide variety of goods such as footwear, rubber heels, etc. . . . the chemical industries are large consumers of limestone and lime. In the manufacture of soda ash by the ammonia-soda process, about $1\frac{1}{4}$ tons of high-calcium limestone is used per ton of soda ash produced. The stone is calcined at the chemical plant and both lime and carbon dioxide gas are used."

Table 411.—Capital Employed in the Stone Quarrying Industry in Canada, by Provinces, 1936

Province	Plants	Capital employed as represented by:					Total
		Present cash value of the land*	Present value of buildings, fixtures, machinery, tools and other equipment	Inventory value of materials on hand, stone in process, fuel and miscellaneous supplies on hand	Inventory value of finished products on hand	Operating capital (cash, bills and accounts receivable, prepaid expenses, etc.)	
	no.	\$	\$	\$	\$	\$	\$
Nova Scotia.....	48	523,141	217,197	28,698	27,000	7,119	803,155
New Brunswick.....	13	78,930	38,100	9,001	2,623	25,199	153,853
Quebec.....	203	1,260,203	1,931,712	502,186	192,419	498,401	4,384,921
Ontario.....	176	1,232,065	2,858,070	199,615	232,962	667,006	5,189,718
Manitoba.....	10	243,579	276,574	31,520	.....	98,137	649,810
Alberta.....	3	.....	1,800	25	.....	.....	1,825
British Columbia.....	105	45,600	567,013	25,001	56,095	22,861	716,570
Canada.....	558	3,383,518	5,890,466	796,046	511,099	1,318,723	11,899,852

* Excluding unmined material.

Table 412.—Employees, Salaries and Wages in the Stone Industry in Canada, by Provinces, 1936

Province	Firms	*Average number of employees				Salaries and wages		
		Salaried employees		Wage-earners	Total	Salaries	Wages	Total
	No.	M.	F.			\$	\$	\$
Nova Scotia.....	21	30		188	218	19,152	163,703	182,855
New Brunswick.....	7	7		123	130	8,158	65,417	73,575
Quebec.....	192	87	8	1,133	1,228	115,727	699,246	814,973
Ontario.....	169	74	14	615	703	159,554	571,841	731,395
Manitoba.....	8	14	1	39	54	30,462	18,464	48,926
Alberta.....	3			3	3		2,411	2,411
British Columbia.....	26	18	1	157	176	27,418	161,663	189,081
Canada.....		230	24	2,258	2,512	360,471	1,682,745	2,043,216

*See note, page 28.

Table 413.—Number of Wage-Earners in Primary Stone Industries, by Months, 1934-1936

Month	1934	1935	1936	Month	1934	1935	1936
January.....	671	779	1,119	July.....	3,172	3,076	3,305
February.....	676	839	1,024	August.....	2,951	3,318	3,232
March.....	845	1,069	1,245	September.....	2,703	3,287	2,699
April.....	1,169	1,580	1,891	October.....	2,366	3,175	2,610
May.....	2,065	2,440	2,871	November.....	1,814	2,584	2,204
June.....	2,893	2,890	3,407	December.....	1,115	1,643	1,266

Table 414.—Production of Granite* in Canada, 1927-1936

(For the years 1886 to 1926 see Mineral Production of Canada, 1928)

Year	Tons	Value	Year	Tons	Value
		\$			\$
1927.....	730,049	1,383,557	1932.....	490,822	1,110,582
1928.....	1,195,810	2,366,946	1933.....	256,723	679,585
1929.....	1,728,165	3,080,815	1934.....	200,285	781,739
1930.....	1,851,132	3,379,951	1935.....	326,354	1,126,287
1931.....	1,190,887	2,763,050	1936.....	941,743	1,319,313

*Includes all igneous rock.

Table 415.—Production of Limestone and Sandstone in Canada, 1927-1936

(For the years 1886 to 1926 see Mineral Production of Canada, 1928)

Year	Limestone		Sandstone		Year	Limestone		Sandstone	
	Tons	Value	Tons	Value		Tons	Value	Tons	Value
		\$		\$			\$		\$
1927.....	6,438,379	7,145,917	132,799	232,793	1932.....	3,687,241	3,227,715	500,480	349,458
1928.....	6,949,420	7,267,437	100,951	223,236	1933.....	2,572,911	2,142,516	99,043	108,562
1929.....	7,720,840	8,172,681	159,407	398,974	1934.....	3,747,779	3,157,832	115,169	143,283
1930.....	7,732,675	8,075,616	384,610	769,060	1935.....	3,631,665	3,253,573	342,824	838,005
1931.....	6,262,430	6,305,538	924,101	1,332,883	1936.....	3,731,548	3,143,872	285,508	495,856

Table 416.—Production of Marble in Canada, 1927-1936

(For the years 1886 to 1926 see Mineral Production of Canada, 1928)

Year	Tons	Value	Year	Tons	Value
		\$			\$
1927.....	5,209	503,037	1932.....	12,379	250,706
1928.....	7,753	414,682	1933.....	10,897	65,913
1929.....	14,012	414,062	1934.....	13,783	69,475
1930.....	26,089	809,582	1935.....	15,975	85,369
1931.....	20,442	668,713	1936.....	22,866	169,698

Table 417.—Production (Sales) of Stone from Canadian Quarries, by Kinds and by Provinces, 1935 and 1936

Province	Granite (b)	Limestone (a)	Marble	Sandstone	Total
1935					
Nova Scotia.....	tons 525 \$ 23,800	8,988 19,188		202,952 578,844	212,465 621,832
New Brunswick.....	tons 31,091 \$ 103,275	53,213 86,001		840 19,447	85,144 208,723
Quebec.....	tons 131,096 \$ 800,685	1,143,983 1,087,320	10,518 43,455	104,920 122,301	1,390,517 2,053,761
Ontario.....	tons 44,473 \$ 93,465	2,061,206 1,680,810	4,726 35,210	12,536 54,407	2,122,941 1,863,892
Manitoba.....	tons 387 \$ 4,630	146,100 189,892	127 1,233		146,614 189,755
Alberta.....	tons \$ 6,981	2,242			2,242 6,981
British Columbia.....	tons 118,782 \$ 100,432	215,933 189,381	604 5,471	21,576 63,006	356,895 358,290
Canada.....	tons 326,354 \$ 1,126,287	3,631,665 3,253,573	15,975 85,369	342,824 838,005	4,316,818 5,303,234
1936					
Nova Scotia.....	tons 66,507 \$ 99,855	20,860 36,365		167,205 239,109	254,572 375,329
New Brunswick.....	tons 1,485 \$ 73,784	53,781 55,564		4,165 4,410	59,431 133,758
Quebec.....	tons 137,912 \$ 429,283	1,265,243 1,058,547	17,866 138,294	92,228 102,388	1,513,249 1,728,512
Ontario.....	tons 492,227 \$ 582,603	2,205,992 1,773,764	4,765 29,204	3,436 10,805	2,706,420 2,396,376
Manitoba.....	tons 185 \$ 2,038	49,261 69,837	60 90		49,506 71,965
Alberta.....	tons \$ 26,188	13,876		40 3,200	13,916 29,388
British Columbia.....	tons 243,427 \$ 131,750	122,535 123,607	175 2,110	18,434 135,944	334,571 393,411
Canada.....	tons 941,743 \$ 1,319,313	3,731,548 3,143,872	22,866 169,698	285,508 495,856	4,981,665 5,128,739

NOTE.—In addition to the above production there were produced 1,247 tons of slate valued at \$5,414 in 1936 and 1,129 tons at \$4,329 in 1935; also not included in the limestone statistics are 1,180,358 tons of limestone consumed in the cement industry in 1936 and 813,443 tons in 1935. Limestone used in the Canadian lime industry is also not included; it is estimated that approximately 800,000 tons of limestone were burned in the manufacture of lime in 1936.

(a) Includes dolomite, also marl for agricultural purposes.

(b) All igneous rocks included.

Table 418.—Production* of Stone in Canada, by Provinces, Showing Purposes for Which Used, 1936 (a)

Item	Nova Scotia	New Brunswick	Quebec	Ontario	Manitoba	Alberta	British Columbia	Canada
Building—								
Rough.....tons		42	11,426	7,749	760		605	20,582
\$		378	28,982	49,406	1,711		620	81,097
Dressed.....tons	1,822	15	13,513	3,632	856	40	1,875	21,753
\$	44,939	360	399,666	41,698	24,216	3,200	119,440	633,519
Monumental and ornamental—								
Rough.....tons	160	292	3,356	512	198		72	4,590
\$	3,175	1,825	25,554	12,093	2,488		4,146	49,281
Dressed.....tons	347	1,148	2,492	13			385	4,385
\$	26,680	71,545	99,503	397			34,250	232,375
Flagstone.....tons			298	681	2			981
\$			1,399	3,251	18			4,668
Curbstone.....tons		3	3,333				3	3,339
\$		36	21,657				100	21,793
Paving blocks.....tons			85	200			4	289
\$			754	1,650			80	2,484
Lining open-hearth furnaces.....tons					895			895
\$					1,713			1,713
Chemical—								
Flux in iron and steel plants.....tons			2,542	180,189	2,106		2,332	187,169
\$			3,679	113,050	3,646		2,331	122,706
Flux in smelters.....tons				92,130				92,130
\$				64,534				64,534
Glass factories.....tons			2,300			1,278		3,578
\$			8,200			1,916		10,116
Pulp and paper mills.....tons	3,610	4,668	92,137	37,492	7,259		52,791	197,957
\$	6,393	6,769	83,124	30,758	4,411		66,068	197,523
Sugar refineries.....tons		52		12,200		10,955		23,207
\$		225		9,150		17,528		26,903
Other chemical uses.....tons	108		3,439	105,830	1,789			111,166
\$	702		2,945	126,046	2,122			131,615
Whiting.....tons								
\$								
Asphalt filler.....tons	50		8,566	1,563				10,179
\$	301		10,526	4,242				15,069
Dusting coal mines.....tons						806		806
\$						3,226		3,226
Agricultural purposes.....tons	15,626	5,300	62,173	10,336		347	249	94,031
\$	27,503	17,500	61,936	7,495		1,387	576	116,397
Crushed for artificial stone.....tons			407	580				987
\$			2,099	3,038				5,137
Rock wool.....tons				9,634				9,634
\$				10,016				10,016
Roofing.....tons				9,515			184	9,699
\$				76,120			2,479	78,599
Poultry grit.....tons			150	1,252	498	490	262	2,652
\$			900	4,333	956	2,131	1,566	9,886
Stucco dash.....tons			730	748	270		212	1,960
\$			3,750	2,348	1,020		1,931	9,049
Terrazzo flooring.....tons			1,216	921			5	2,142
\$			7,178	4,126			100	11,404
Rubble and riprap.....tons		47,911	176,244	23,058	660		228,775	476,648
\$		35,120	111,430	20,189	700		83,997	251,436
Concrete aggregate.....tons	106		690,002	323,237	800			1,014,145
\$	106		465,310	264,226	975			730,617
Crushed stone								
Road metal.....tons	232,105		412,258	1,145,734	33,413		80,417	1,903,927
\$	264,669		368,926	929,928	27,989		61,622	1,653,134
Railroad ballast.....tons	638		27,385	739,474			16,584	784,081
\$	861		21,849	620,362			16,584	659,656
Total.....tons	254,572	59,431	1,514,052	2,706,680	49,506	13,916	384,755	4,982,912
\$	375,329	133,758	1,729,367	2,398,456	71,965	29,388	395,890	5,134,153
Per cent of total.....Quantity	5.11	1.19	30.39	54.32	0.99	0.28	7.72	100.00
Value	7.31	2.61	33.68	46.72	1.40	0.57	7.71	100.00

NOTE.—See footnote to table 417.

*Sales or shipments from quarries.

(a) Includes the production of slate.

Table 419.—*Production of Stone in Canada, by Kinds, Showing Purposes for Which Used, 1936

For use as follows—	Granite(b)	Lime- stone(a)	Marble	Sandstone	Total
Building stone—					
Rough..... tons	2,840	15,418	129	2,195	20,582
..... \$	10,472	57,199	5,690	7,736	81,097
Dressed..... tons	5,624	11,465	937	3,727	21,753
..... \$	171,858	189,064	104,738	167,859	633,519
Monumental and ornamental stone—					
Rough..... tons	4,087	84	419		4,590
..... \$	35,234	1,857	12,190		49,281
Dressed..... tons	4,355	30			4,385
..... \$	231,482	893			232,375
Flagstone..... tons	10	340		631	981
..... \$	90	1,806		2,772	4,668
Curbstone..... tons	3,339				3,339
..... \$	21,793				21,793
Paving blocks..... tons	289				289
..... \$	2,484				2,484
Lining open-hearth furnaces..... tons		895			895
..... \$		1,713			1,713
Chemical—					
Flux in iron and steel plants..... tons		187,169			187,169
..... \$		122,706			122,706
Flux in smelters..... tons		92,130			92,130
..... \$		64,534			64,534
Glass factories..... tons		1,278	2,300		3,578
..... \$		1,916	8,200		10,116
Pulp and paper mills..... tons		192,997	4,960		197,957
..... \$		193,555	3,968		197,523
Sugar refineries..... tons		23,207			23,207
..... \$		26,903			26,903
Other chemical uses..... tons		107,761	3,405		111,166
..... \$		129,091	2,724		131,815
Whiting..... tons					
..... \$					
Asphalt filler..... tons	6,413	3,766			10,179
..... \$	4,827	10,242			15,069
Dusting coal mines..... tons		806			806
..... \$		3,226			3,226
Agricultural purposes..... tons		93,071	960		94,031
..... \$		114,477	1,920		116,397
Crushed stone for manufacture of artificial stone..... tons			987		987
..... \$			5,137		5,137
Rock wool..... tons		9,634			9,634
..... \$		10,016			10,016
Roofing..... tons	9,255				9,255
..... \$	74,040				74,040
Poultry grit..... tons		1,250	1,402		2,652
..... \$		4,653	5,233		9,886
Stucco dash..... tons	3	479	1,478		1,960
..... \$	50	2,901	6,098		9,049
Terrazzo flooring..... tons	5		2,137		2,142
..... \$	100		11,304		11,404
Rubble and riprap..... tons	295,063	171,407	2,102	7,273	475,845
..... \$	121,680	121,106	1,362	6,433	250,581
Crushed stone—					
Concrete aggregate..... tons	25,445	985,075	650	2,975	1,014,145
..... \$	32,921	694,198	627	2,871	730,617
Road metal..... tons	160,019	1,514,661	1,000	228,247	1,903,927
..... \$	195,095	1,182,909	507	274,623	1,653,134
Railroad ballast..... tons	424,996	318,625		40,460	784,081
..... \$	417,187	208,907		33,562	659,656
Total, Canada (a)..... tons	941,743	3,731,548	22,866	285,508	4,981,665
..... \$	1,319,313	3,143,872	169,698	495,856	5,128,739

(a) Does not include limestone used in Canadian lime and cement industries, but includes marl used for agricultural purposes.

(b) Includes all igneous rock.

* Production of slate shown in table 422.

Table 420.—Production of Stone for Building Purposes, Chemical Purposes, Cement Manufacture, Concrete Aggregate, Road Metal and Railway Ballast, 1930-1936

		Building stone (a)	For chemical purposes (b)	For concrete aggregate	For road metal	For railroad ballast	For cement manu- facture
1930.....	tons	173,204	586,456	2,115,104	3,910,245	2,036,981	2,925,399
	\$	4,184,778	540,534	1,623,904	3,434,935	1,674,298	.....
1931.....	tons	129,345	333,699	3,275,276	3,122,633	652,352	2,489,147
	\$	3,717,993	314,088	2,565,204	2,557,515	485,447	.....
1932.....	tons	62,951	226,966	1,929,756	1,847,371	89,835	1,141,376
	\$	1,035,571	188,820	1,320,088	1,474,870	84,930	.....
1933.....	tons	40,299	315,287	981,460	1,212,981	93,624	616,364
	\$	340,852	297,652	682,213	969,504	52,359	.....
1934.....	tons	52,665	489,580	821,099	2,062,487	345,802	806,546
	\$	490,095	447,429	608,240	1,668,927	209,296	.....
1935.....	tons	200,899	537,799	804,719	1,976,363	351,302	818,443
	\$	1,258,741	483,709	523,847	1,987,351	211,993	.....
1936.....	tons	42,335	615,207	1,014,145	1,903,927	784,081	1,180,358
	\$	714,616	553,597	730,617	1,653,134	659,656	.....

(a) Does not include monumental or ornamental stone.

(b) Does not include limestone used in Canadian lime industry.

Table 421.—Consumption of Whiting, by Uses, as Reported to the Annual Census of Industry, 1935-1936

Industry	1935		1936	
	Tons	Cost at works	Tons	Cost at works
		\$		\$
Paints and pigments.....	5,921	103,837	6,082	105,678
Rubber.....	5,101	110,784	6,352	92,192
Miscellaneous textiles*.....		14,718		18,605
Ammunition.....	10	291	10	308
Miscellaneous non-metallic manufactures.....	14	680	5	240
Total accounted for.....		230,310		217,023

* Includes oilcloth and linoleum.

SLATE

Slate deposits located along the south shore of the St. Lawrence river in Quebec, were operated for the first time in 1854. Production from these deposits reached a maximum in point of value in 1889 when 6,935 tons valued at \$119,160 were shipped. These shipments consisted of roofing slates, mantels and slabs. Quarrying operations were carried on at the Quebec deposits up to 1923, in which year 1,836 tons of crushed green and red slate were shipped for use in the manufacture of roofing material.

No slate was produced in Canada from 1923 to 1929; each year since 1930 there has been a production of the material and in 1935 shipments of slate were made from quarries located at Broughton Station, Quebec, and Sooke Lake, British Columbia.

In 1936 production came from properties operated in the Eastern Townships, Quebec; Hastings county, Ontario, and British Columbia.

Table 422.—Production of Slate in Canada, 1924-1936

Year	Tons	Value	Year	Tons	Value
		\$			\$
1924-1929.....			1933.....	250	3,750
1930.....	150	3,000	1934.....	738	4,802
1931.....	250	5,000	1935.....	1,129	4,329
1932.....	250	3,750	1936.....	*1,247	5,414

NOTE.—For years 1886 to 1923 see previous reports. For imports and exports of slate see table 423.

* 444 short tons for roofing purposes and 803 short tons as rubble and riprap.

Table 423.—Imports into Canada and Exports of Stone, by Kinds, 1935 and 1936

	1935		1936	
	Tons	Value	Tons	Value
		\$		\$
IMPORTS—				
Curling stones and handles..... pair	412	10,079	618	13,354
Building stone, other than marble or granite, sawn on more than two sides, but not sawn on more than four sides.....	8	138		
Building stone, other than marble or granite, planed, turned, cut, or further manufactured than sawn on four sides.....	20	1,127	87	9,222
Flagstone, sandstone, and all building stone, not hammered, sawn or chiselled.....	4,749	20,193	3,049	20,446
Flagstone and building stone, other than marble or granite, sawn on not more than two sides.....	514	3,091	460	3,456
Granite, rough, not hammered or chiselled.....		65,185		70,667
Granite, sawn only.....		8,336		7,094
Granite, monuments.....		22,008		17,628
Granite, manufactures of, n.o.p.....		3,607		4,733
Marble, rough, not hammered or chiselled.....		4,926		15,765
Marble, sawn or sand rubbed, not polished.....		9,685		24,107
Marble, not further manufactured than sawn for tombstones.....		15,246		11,715
Marble, manufactures of, n.o.p.....		9,640		15,774
Paving blocks of stone.....				20
Refuse stone, not sawn, hammered or chiselled.....	382,186	202,416	304,440	184,481
Slate roofing..... square	1,424	11,197	1,426	12,294
Slate pencils and school writing slates.....		18,896		8,524
Slate mantels and manufactures of slate, n.o.p.....		6,295		13,337
Chalk, china, Cornwall or cliff stone and mica schist.....		20,229		32,253
Mineral wool.....	962	57,877	1,196	101,592
Whiting, gilders' whiting and Paris white.....	12,366	118,731	12,498	121,017
Manufactures of stone, n.o.p.....		19,416		17,055
Lithographic stones not engraved.....		391		186
Chalk, prepared.....		8,396		8,219
Pumice and pumice stone, lava and calcareous tufa, not further manufactured than ground.....		30,971		21,275
Grindstones, not mounted, and not less than 36 inches in diameter..... No.	1,089	140,208	1,013	122,028
Total.....		808,284		856,242
EXPORTS—				
Crushed stone.....	54,669	98,244	49,728	90,924
Granite and marble, unwrought.....	1,255	10,301	1,156	8,788
Freestone, limestone, and other building stone, unwrought.....	47	433	571	2,090
Dressed stone of all kinds.....		1,917		3,380
Grindstones, manufactured.....		74		1,688
Total.....		110,969		106,870

(2) Secondary Production—The Monumental and Ornamental Stone Industry

In 1936 there were 227 stone dressing works not operating in conjunction with the producers' own quarries. These works were engaged chiefly in cutting and polishing Canadian or imported stone to produce finished monuments or dressed stone for construction purposes. Output from these establishments was valued at \$3,309,911 in 1936, a gain of 6 per cent over the \$3,079,118 in 1935. Ontario plants numbering 121 accounted for 56 per cent of the total production and the 47 works in Quebec made 18 per cent.

The average number of employees in this industry in 1936 was 1,245 compared with 1,066 in the previous year; payments in salaries and wages advanced to \$1,357,808 from \$1,174,229.

Purchased materials, excluding fuel and power, used in manufacturing cost \$1,070,902 in 1936 against \$1,010,999 in 1935.

Output value of dressed monumental and ornamental stone advanced 1 per cent during 1936 to \$1,734,278 from \$1,732,601, while the value of dressed building stone declined 21 per cent to \$1,654,034 from \$2,094,843 in 1935.

Table 424.—Production from the Monumental and Ornamental Stone Industry, by Provinces, 1935 and 1936

—	Granite		Marble		Marble chips and dust	Limestone		Finished monuments, lettered only	Other products	Total
	Monu-ments	For building purposes	Monu-ments	For building purposes		Monu-ments and bases	For building purposes			
	\$	\$	\$	\$	\$	\$	\$	\$	\$	\$
Prince Edward Island										
1935.....	8,300		12,511			2,000		7,811		30,622
1936.....	7,900	30	12,800	23				6,280		27,033
Nova Scotia—										
1935.....	58,039		10,589	200		2,430		22,212	1,824	95,294
1936.....	63,801		11,631	200		2,953		19,038	1,058	98,681
New Brunswick—										
1935.....	33,665	1,710	1,725			1,785		2,225	433	41,543
1936.....	48,231	1,100		620		140		2,180	270	52,541
Quebec—										
1935.....	270,464	73,659	22,181	41,721	647	2,130	215,450	31,294	15,424	672,970
1936.....	321,039	117,068	19,715	48,759	1,047	3,190	40,621	19,691	27,258	598,388
Ontario—										
1935.....	707,889	60,395	64,565	64,882	2,775	9,605	566,538	271,187	47,083	1,794,919
1936.....	699,148	37,159	60,015	36,107	210	18,041	435,754	289,282	287,775	1,863,491
Manitoba—										
1935.....	56,793	20,093	6,661	13,539	900	2,139	27,382	25,601	735	153,843
1936.....	51,485	210	3,949	33,531	5,658	1,368	9,872	32,146	1,172	139,391
Saskatchewan—										
1935.....	40,200	5,043	18,206	2,450	500	5,751	13,615	9,597	2,752	98,114
1936.....	42,616	1,455	20,716	2,087	840	7,320	18,128	9,170	31,670	134,002
Alberta—										
1935.....	48,048	6,000	15,136	4,000	7,013	850	15,000	5,495	1,626	103,168
1936.....	40,110	4,000	14,072	4,000	5,031	2,150	10,000	9,401	1,870	90,634
British Columbia—										
1935.....	45,016	17,133	6,675	3,435	35			14,134	2,217	88,645
1936.....	42,675	169,284	7,731	50,507	21			23,452	12,080	305,750
Canada—										
1935.....	1,268,414	184,633	158,249	130,227	11,870	26,690	837,985	389,556	72,094	3,079,118
1936.....	1,317,005	330,306	150,629	175,834	12,807	35,162	514,375	410,640	363,153	3,309,911

APPENDIX

CANADIAN DIAMOND DRILLING INDUSTRY, 1936

A statistical survey of Canadian firms whose principal business is diamond drilling by contract was conducted for the calendar year 1936. Returns were received from 25 active operators or about 76 per cent of the firms reported as conducting drilling during the year under review. Footage drilled by these firms in the exploration for metals totalled 1,311,384 valued at \$2,867,110; exploration of or for non-metallic minerals totalled 149,788 feet valued at \$449,799 while drilling for foundations or other purposes amounted to 2,385 feet worth \$17,054.

Employees in the industry totalled 790 and salaries and wages aggregated \$1,207,032. Borts weighing 88,873 carats and valued at \$378,551 were purchased during 1936.

It should be noted that the data in the following tables do not include those pertaining to diamond drilling operations conducted by mining companies proper; general statistics of employment, etc., relating to such operations are combined with those of the mining industry.

Table 425.—Drilling Operations Conducted under Contract During the 12 Months Ending December 31, 1936

Drilling on Mining Properties or for Purposes other than for Water Supply*

Location of Operation	No. of holes drilled	Nature of operation					
		For Metals		For Non-metallic Minerals		Other Purposes (a)	
		Footage drilled	Income from drilling	Footage drilled	Income from drilling	Footage drilled	Income from drilling
			\$		\$		\$
Nova Scotia.....	5	3,364	9,484				
Quebec.....	1,345	315,169	566,430	40,341	112,553		
Ontario.....	3,221	726,284	1,872,362	104,066	330,661		
Manitoba.....	352	90,159	136,525				
Saskatchewan.....	179	36,911	63,746	3,891	1,951	1,384	1,038
Alberta.....	5			1,490	4,634		
British Columbia.....	1,094	136,898	210,766			1,001	16,016
Yukon and N.W.T.....	14	2,599	7,797				
Canada.....	6,215	1,311,384	2,867,110	149,788	449,799	2,385	17,054

(a) Testing for foundations, etc.

*Does not include drilling conducted by mining, gas, or oil companies.

Table 426.—Capital Employed, Average Number of Employees, and Salaries and Wages Paid, in the Diamond Drilling Industry, by Provinces, 1936

Provinces	Number of firms reporting	Capital employed	Fuel, electricity and process supplies used	Average Number of employees	Salaries and wages paid
		\$	\$		\$
Nova Scotia.....	1	(a)	823	5	4,642
Quebec.....	9	137,926	70,597	151	248,928
Ontario.....	20	857,911	221,594	470	715,039
Manitoba.....	5	8,025	25,850	39	43,490
Saskatchewan.....	6	7,000	8,474	17	26,435
Alberta.....	1	(b)	(b)	(b)	(b)
British Columbia.....	4	348,065	17,785	107	165,853
Yukon and N.W.T.....	1	(a)	653	1	2,645
Canada.....		1,358,927	345,776	790	1,207,932

(a) Not recorded separately and probably included under Province in which Head Office of Company is located.

(b) Data not available.

Table 427.—Fuel and Electricity Used by the Diamond Drilling Industries during 1936

Kind	Quantity	Cost at plant
		\$
Bituminous coal (a) From Canadian mines.....	245 short tons	2,940
(b) Imported.....	967 "	6,550
Coke (for fuel only).....	short tons	
Gasoline (exclusive of that used in motor cars or trucks).....	122,451 imp. gals.	50,658
Kerosene or coal oil.....	80 imp. gals.	25
Wood (cords of 128 cubic feet of piled wood).....	1,412 cords	6,107
Other fuel (state kind and quantity).....		24
Electricity purchased (including service charge in cost).....		138
Total (cost only).....	x x x x x	66,442

Table 428.—Power Equipment (including Stand-by or Emergency Equipment)

Description	Ordinarily in use		In reserve or idle	
	Number of units	Total h.p. (according to manufacturers' rating)	Number of units	Total h.p. (according to manufacturers' rating)
1. Steam engines and steam turbines.....	24	307	2	250
2. Diesel engines.....	1	(a)		
3. Gasoline, gas and oil engines, other than diesel engines.....	127	1,251	24	296
4. Electric motors—Operated by purchased power.....	4	60	1	16
Total (1), (2), (3) and (4).....	156	1,619	27	562
All boilers.....	20	115	1	10

(a) Not known.

Process supplies (except as shown in table 428) consumed during the year: explosives, drill steel, rods, bits, lubricants, etc., \$279,334.

Table 429.—Directory, Canadian Diamond Drilling Industry*

Name	Province operated in	Head Office Address
Arno Diamond Drilling Contractors.....	Ontario.....	161 Pine St. N., Timmins, Ont.
Auric Ltd.....	Ontario and Manitoba.	404 Bank of Hamilton Bldg., 67 Yonge St., Toronto, Ont.
Baderski, Frank & Son.....	Ontario.....	34 Tamarack St., Timmins, Ont.
Baker & LaRocque.....	Quebec.....	Box 93, Val D'Or, Que.
Boyles Bros. Drilling (Eastern) Ltd.....	Quebec, Ontario, Manitoba, Saskatchewan and British Columbia.....	142 N. Cumberland St., Port Arthur, Ont.
Burton, Archie S.....	Ontario.....	352 Howey Crescent, Sudbury, Ont.
Bush, O. D.....	Alberta.....	Bank of Nova Scotia Bldg., Edmonton, Alta.
T. Connors Diamond Drilling Co., Ltd.....	Nova Scotia, Quebec, Ontario, Saskatchewan and British Columbia.....	744 West Hastings St., Vancouver, B.C.
Diamond Drill Contracting Co.....	British Columbia.....	Box 947, Spokane, Washington, U.S.A.
Drillers, D. J.....	Ontario.....	Box 239, Sioux Lookout, Ont.
Dynes, R. F.....	Ontario.....	Sioux Lookout, Ont.
Grexton, J. A.....	Ontario.....	Chaput-Hughes, Ont.
Hall, W. S.....	Ontario.....	701 National Bldg., Toronto, Ont.
Heath & Sherwood.....	Quebec, Ontario, Saskatchewan.....	23 Kirkpatrick St., Kirkland Lake, Ont.
Inspiration Mining & Developing Co., Ltd.....	Quebec.....	Box 187, Amos, Que.
McCarthy, C. M. (Shallow River Mines, Ltd.).....	2 Companies—Ontario and Saskatchewan.....	Matheson, Ont.
Morissette, N.....	Quebec, Ontario, Saskatchewan, Yukon and N.W.T.....	Box 440, Haileybury, Ont.
Mumford Medland Ltd.....	Manitoba.....	576 Wall St., Winnipeg, Man.
Ontario Diamond Drilling Co., Ltd.....	Ontario and Manitoba.....	203 Mackay Bldg., Sudbury, Ont.
Ryan Diamond Drilling Co., Ltd.....	Ontario.....	217 Spruce St. S., Timmins, Ont.
Smith & Travers Co., Ltd.....	Quebec, Ontario, Manitoba and Saskatchewan.....	208 Walnut St., Sudbury, Ont.
Soo Diamond Drilling Co., Ltd.....	Ontario.....	612 Queen St. E., Sault Ste. Marie, Ont.
Sprague & Henwood Ltd.....	Quebec and Ontario.....	180 Vallee St., Montreal, Que.
Sullivan Drill Co., Ltd.....	Quebec and Ontario.....	Rouyn, Que.
Timmins, N. A. Corporation.....	Ontario, British Columbia.....	1010 Canada Cement Bldg., Montreal, Que.
Wilson & Rabb Diamond Drilling Contractors.....	Quebec.....	129 Tremay Road, Noranda, Que.

*The figures in the foregoing tables were compiled from returns received from the firms listed above. In addition to the names listed there were several other firms from whom reports were unobtainable.

WATER WELL DRILLING INDUSTRY, 1936

A survey of the water well drilling operations in the Dominion was attempted during 1936. Much of this drilling is conducted as a part time occupation by individuals and the collection of satisfactory data was found very difficult.

The following tables represent the compilation of statistics made available for the calendar year 1936. Operators in this industry chiefly employ churn (cable) or shot drills.

Table 430.—Drilling for Water Supply in Canada, 1936

Location of Operation	Number of wells drilled	Footage drilled	Income from drilling
			\$
Nova Scotia.....	9	746	347
Quebec.....	14	904	1,452
Ontario.....	322	28,515	38,670
Manitoba.....	16	1,930	2,290
Saskatchewan.....	83	8,956	10,530
British Columbia.....	11	776	1,852
Canada.....	455	41,827	55,141

Table 431.—Employment, etc., in Water Well Drilling Industry, 1936

Active firms reporting.....	No.	68
Capital employed.....	\$	129,039
Number of employees.....	No.	55
Salaries and wages.....	\$	26,498
Cost of fuel and electricity.....	\$	7,156
Cost of process supplies.....	\$	5,285

Table 432.—Power Equipment (including Stand-by or Emergency Equipment), 1936

Description	Ordinarily in use		In reserve or idle	
	Number of units	Total h.p. (according to manufacturers' rating)	Number of units	Total h.p. (according to manufacturers' rating)
Steam engines and steam turbines.....	2	106	2	78
Gasoline, gas and oil engines, other than diesel engines.....	48	866	12	140
Total.....	50	972	14	218
All boilers.....	1	40		

 DIRECTORY, CANADIAN WELL DRILLERS, 1936

NOVA SCOTIA—

Simpson, L. (Sold to Minas Basin Pulp & Paper Co.),
New Glasgow.
†Walters, Geo., Westville.

QUEBEC—

†L'Ecuyer, George, Napierville.

ONTARIO—

Adams, J. H. & Son, Carleton Place.
†Adams, Thos., Ramsayville, Ont.
Arbuckle, Andrew, Carleton Place.
Barkley & Alguire, Williamsburg.
†Bedger, Herman, Port Elgin.
Broadway, C. F., Sutton West.
†Campbell, Mr., Box 53, Newtonington.
†Chalk, Mr., Napanee, Ont.
†Clark, Adam, Hannon, Ont.
Conlin, Frank, Port Lambton, R.R. No. 3.
†Corkright, Jack, Marmora.
†Cranberry, John, Co., Marmora.
†Cudney, John, Fergus.
Currie, E. A., Denfield.
Currie, Edwin, Dobbinton.
†Davy, W. A., Verona.
Dillabough, Fred, Mountain, R.R. No. 3.
Demaray, Clarence, Kerwood, R.R. No. 1.
Eaton, A. W., 630 Elm St., Humberstone.
Eberts, Daniel, Wallaceburg.
†Elliott, W., Belleville.
†Embleton, B., Albion Falls.
Field, W. L., Vineland, R.R. No. 1.
†Friend, David, Aylmer, Que.
†Gartley, Mr., Belleville.
Gill, A., 489 Concession St., Hamilton.
Gow, O. H., Fergus.
†Graham, Los., Ringwood.
Gregory, Geo. F. & Son, Box 804, Petrolia.
†Hammond, Mr., Cobocok.
Heal, A. A., Corunna.
Hillier, Geo. W., Box 33, Trenton.
Hilts, W. A., Whitevale.
Hussey, W. J. & Son, Box 304, Petrolia.
Johnston, A. B., 30 Mayor St., London.
†Johnson, S., Ridgeway.
†Kerr, Harry, Elora.
Kiser Bros., 90 Part St., Chatham.
†Knoll, Louis, Humberstone, R.R. No. 1.
Lalonde, Alcide, St. Alberts.
Leduc, Medrick, Cryslar.
†Lott, W., Hannon, R.R. No. 1.
†Marshall, Mr., Plainfield.
†Matthews, Ben., Ridgeway.
McAlpine, Archie, Walkers.
McBain, Ronald, Frankville.
†McCarthy Bros., Newboro.
†McCauley, A., St. Mary's.
†McGregor, Gilbert, Vernon.
McKillop, Wm., Hepworth.
McLean, Freeman A., 374 Gilmour St., Ottawa.
†McLuban, A., 25 Glenelbe St., Lindsay.
†Merritt, Sid., Smithville.
†Moore, Harry, Vernon.
†Morrison, W. J., Jasper.
Mosley, Thos. R. & Son, 48 Colborne St. W., Lindsay.
†Muir, Wm., 442 Gilmour St., Ottawa.
Nagal, Elmer, Stevensville, Ont.
†Patterson, John H., Smithville.
Pegg, Harrison, Thornhill.
†Pegg, Nat., Thornhill.
Perkins, J. E. (Standard Gas & Oil Syndicate), Fisher-
ville.
†Rankin, Ken., Bickford.

ONTARIO—Concluded

†Robin, Thomas M., Beamsville.
Robinson, Eugene, Cochrane.
†Rodgers, G., Petrolia.
†Roffey, Ed., Markham.
Rennick, Stanley, Bright.
†Scott, Thos., Merrickville.
†Segers, Mr., Wellington Road, London.
Smith, A. E., 3rd St., Rainy River.
†Sparks, W. M., Woodroffe.
Spencer, Frank, York.
†Springer, M., Waterdown.
†Stevenson, Mr., Welland.
Stubble, H. H., 207 Patterson Ave., Chatham.
Summers, J. W., Colborne.
Summers, Wm., Williamsburg.
Sundin, Leonard, Kingsville.
Taylor, Edward, Madoc.
†Winner, Lewis, Chesley.

SASKATCHEWAN—

†Arbart, Fred, Duva.
Authier, Charles E., Domremy.
†Babin Bros., Wapella.
Benson, Glenn, Rockglen.
†Bias, P., Wolseley.
†Borning, H., Wapella, Ont.
Boss, F. D., Grenfell.
†Buchamer, Mr., Earl Grey.
†Canada Well Supply Co., Regina.
Clark, W. E., Wolseley.
†Davis, Alfie, Gowan.
†Earhardt, Dave, Duval.
†Earhardt, Fred, Duval.
†Engstrom, O., Percival.
†Filbert, Alex, Burstall.
Forester, C., Choiceland.
†Halgriemson, Herman, (Yorkton Dist.).
†Hardy, Willis, Earl Grey.
Herbster, Otto, Whitewood.
†Hewitt, J., Grenfell.
Hortness, Christian Christopher, Box 120, Redvers;
†Jeffreys, Ben, Wilkie.
†Johansen, John, Stockholm.
Kipp, Samuel, Box 323, Wilkie.
Knowles, Jack, Wapella.
Lealos, John, Coxby.
Maley Drilling Service, 1009 Second St., Estevan.
Masters, Wm., Nipawin.
McDonald, Alex, Box 57, Senlac.
McEwan, D., 128-1st Ave., N.W. Moose Jaw.
McKerriher, E. A., Box 30, Horizon.
†Murray, Geo., Walpole.
Pederson, Al, Simpson.
†Pederson, Wilbert, Box 109, Pederson.
†Rike, T., Broadview.
†Rough, O., Broadview.
Sales, Philip, Mervin.
Siebel, Adolph, Box 206, Whitewood.
Soloshy, John & Co., Stockholm.
Sundin, Martin, Colansay.
†Tribel, A., Whitewood.
Walls, Charles, Dodsland.
Ward, M. J., Earl Grey.
Williamson, Herbert N., Eston.
Woronluk, P., Wishart.
Yacowar Bros., Box 30, Burstall.

ALBERTA—

Godwin, D. S., Sidney P.O., Vancouver Island, B.C.

BRITISH COLUMBIA—

†Bywell, A., R.M.D., Duncan, Vancouver Island.

 †Companies whose figures are *not* included in the *well-drilling report, 1936*.

EXPLANATORY NOTES

Method of Computing Quantities and Values of the Mineral Production of Canada in 1936.

Arsenic.—White arsenic (As_2O_3) shipped from Canadian smelters at its sales value.

Bismuth.—(a) Recoverable metal in silver-lead-bismuth bullion shipped to foreign smelters for refining at an arbitrary price; (b) Bismuth metal produced at Canadian smelters valued at the average New York price for the year.

Cadmium.—Smelter production valued at the average London price for the year.

Cobalt.—Cobalt content of the various cobalt products sold by the Ontario smelter producing these products added to the cobalt content of ores and residues exported for treatment in foreign smelters; the value given is the net amount received by the shippers.

Copper.—(a) Recoverable copper in ores and concentrates exported valued at the average London price for the year, in Canadian funds; (b) Copper in blister copper made at Manitoba, Ontario and Quebec smelters valued at the average London price for the year in Canadian funds; (c) Copper in copper-nickel matte exported from Canadian smelters valued at an arbitrary price agreed upon between the Dominion Bureau of Statistics and the Ontario Department of Mines.

Gold.—Gold in bullion produced and the recoverable gold in all other Canadian mine products is valued at the standard rate of \$20·671834 per fine ounce until the end of 1930. For succeeding years unless otherwise specified gold is valued at the average price on world markets transposed to Canadian funds.

Lead.—Recoverable lead in ores exported from Canada added to lead contained in base bullion made at Trail, B.C., valued at the average London quotations for the year in Canadian funds.

Nickel.—(a) Refined and electrolytic nickel produced at Canadian refineries valued in Canadian funds at the average price obtained for such products sold during the year; (b) Nickel in oxides and salts sold from Canadian smelters and refineries at its total selling value in Canadian funds in the form in which it was sold; (c) Nickel in matte exported from Canada valued at an arbitrary figure agreed upon by the Ontario Department of Mines and the Dominion Bureau of Statistics (representative of the value of the nickel in matte form).

Platinum Group Metals.—Recoverable metals in smelter products and placer platinum at the average London price and transposed to Canadian funds.

Silver.—Silver bullion produced and the recoverable silver in other smelter products, and the recoverable silver in Canadian ores exported, at the average New York price for the refined metal in Canadian funds.

Tellurium and Selenium.—Smelter production valued at the average London price for the year.

Zinc.—Refined zinc produced by the Consolidated Mining and Smelting Co., Ltd., at Trail, B.C., and by the Hudson Bay Mining and Smelting Co., Ltd., Flin Flon, Manitoba, and the recoverable zinc in concentrates exported, valued at the average monthly price quoted in London, in Canadian funds.

Coal.—Output tonnage evaluated pro rata according to income from sales.

Other Non-Metallic Minerals, Clay Products and Structural Materials.—Shipments during the year at their respective sales values.

Imports.—Statements of quantities and values are based on the declarations of importers, as subsequently checked by government officials.

The value of imported merchandise is the fair market value or the price thereof when sold for home consumption in the principal markets of the country whence and at the time when the same were exported directly to Canada. The price and value of the goods in every case are stated as in condition packed ready for shipment, the fair value being shown in the currency of the country of export, and the selling price to the purchaser in Canada shown in the actual currency in which the goods were purchased. In the case of goods that are the manufacture or produce of a foreign country, the currency of which is substantially depreciated, the value stated is the value that would be placed on similar goods manufactured or purchased in the United Kingdom and imported from that country, if such similar goods are made or produced there. If similar goods are not made or produced in the United Kingdom, the value stated is the value of similar goods made or produced in any European country the currency of which is not substantially depreciated.

Exports.—Statements of quantities and values are based on the declaration of exporters as subsequently checked by government officials.

The value of exports of Canadian merchandise is the actual cost or the value at the time of exportation at the points in Canada whence originally shipped.

Weight.—Weight, where shown in imports and exports is the net weight of the goods, excluding the weight of the covers or receptacles, except in the cases of certain goods, as provided in the tariff.

The expression "ton" means 2,000 pounds, and cwt. 100 pounds, avoirdupois. Where other units of quantity are used, imperial standards apply.

DIRECTORY OF FIRMS

In the following pages the names and addresses of all the principal operators in the Canadian mining industry are given and the location of the properties worked in 1936 is also shown.

METAL MINING INDUSTRIES

Alluvial Gold Mining Industry

Name	Head office address	Location
NOVA SCOTIA—		
Young, Oscar J.	Ovens.	Ovens Gold District.
QUEBEC—		
Dion, Geo. A.	19 rue St. Etienne, Levis.	Rivière des Plantes
Embergold Placers.	956 New Birks Bldg., Montreal.	Compton Co.
BRITISH COLUMBIA—		
Adams, Geo. A.	Atlin.	Atlin Mining Div.
Anderson, Oliver.	Fort Steele.	Fort Steele Mining Div.
Anthony, J. H.	Lytton.	Fraser River.
Antler Gold Mines Ltd.	Renfrew Bldg., Calgary, Alberta.	Cariboo Mining Div.
C. F. & Don Baker, Jas. Stokes, and B. John- son.	Atlin.	Atlin Mining Div.
Baker, Geo., and Peeling, A.	Keithley Creek.	Quesnel Mining Div.
Barrington, S. C.	Wrangell, Alaska.	Cassiar Mining Div.
B.C. Development Ltd.	Quesnel.	
Antler Placer Mines Ltd.	724 Nelson St., Vancouver.	Caribou Mining Div.
Boquist, T.	Atlin.	Atlin Lake
Bride, Maurice.	Atlin.	Spruce Creek.
Bullion Placers, Ltd.	736 Granville St., Vancouver.	Quesnel Mining Div.
Cedar Creek Hydraulic Mines, Ltd.	323 Gayward Bldg., Victoria.	Quesnel Mining Div.
Colpe Mining Co., Ltd.	Atlin.	Spruce Creek.
Columbia Development, Ltd.	410 King St. S., Kitchener, Ont.	Atlin Mining Div.
Consolidated Gold Alluvials of B.C., Ltd.	708 Vancouver Block, Vancouver.	Cariboo Mining Div.
Consolidated Mining and Smelting Co. of Canada, Ltd.	Trail.	Atlin.
		Cariboo Mining Div.
		Fort Steele Mining Div.
		Omineca Mining Div.
		Cariboo Mining Div.
		Fort Steele Mining Div.
		Red Gulch Creek.
		Spruce Creek.
		Omineca Mining Div.
		Omineca Mining Div.
		Atlin Mining Div.
		Omineca Mining Div.
		Quesnel Mining Div.
		(a)
		Atlin Mining Div.
		Atlin Mining Div.
		Vernon Mining Div.
		Atlin Mining Div.
		Atlin Mining Div.
		Spruce Creek.
		Greenwood Mining Div.
		Fort Steele Mining Div.
		Atlin Mining Div.
		Quesnel Mining Div.
		Spruce Creek.
		Cariboo Mining Div.
		Peace River Mining Div.
		Spruce Creek.
		Ruby Creek.
		Birch Creek.
		Spruce Creek.
		Quesnel Mining Div.
		Ruby Creek.
		Atlin Mining Div.
		O'Donnell River.
		Omineca Mining Div.
		Fort Steele Mining Div.
		Fraser River.
		Quesnel Mining Div.
		Cariboo Mining Div.
		(a)
		O'Donnell River.
		Quesnel Mining Div.
		Spruce Creek.
Dragon Creek Hydraulic.	Barkerville.	
Drayton, Wm. A.	Fort Steele.	
Eastman Red Gulch Placers, Ltd.	Barkerville.	
Falconer, D. K.	Atlin.	
Fowler, Luke.	Hazelton.	
Germansen Mines, Ltd.	789 Pender St. W., Vancouver.	
Giesen & Huffman.	Atlin.	
Hagberg, H. A.	Fort St. James.	
Hasbrouck & Bower.	Keithley.	
Hepper, H. R.	Kimberley.	
Hill, C.	Atlin.	
Hodges & Moran.	Atlin.	
Holden-Eureka Placer Mines, Ltd.	389 Main St., Winnipeg, Man.	
Husselbec & Smith.	Atlin.	
Ivanic & Co.	Atlin.	
Johnson & Co.	Atlin.	
Jolly Creek Placers Syndicate.	Rock Creek.	
Keller, Ernest.	Lumberton.	
Kennedy, Wm.	Atlin.	
Kuchan, Geo.	Horsefly.	
Lokke, Louis.	Atlin.	
Lowhee Mining Co., Ltd.	917 Rust Bldg., Tacoma, Wash.	
Mahaffy, Wm. A.	Brennan Flat via Hudson Hope.	
Marshall, H.	Atlin.	
Matson & Schulz.	Atlin.	
McDonald & Sandstrom Co.	Atlin.	
McKinnon, Charles.	Atlin.	
Moose Syndicate.	Likely.	
Morrison & McKay.	Atlin.	
Munro, McKay & McDonald.	Atlin.	
Murphy, Nathan.	Atlin.	
Northern Ventures, Ltd.	Besner Block, Prince Rupert.	
Perry Creek Placers Syndicate.	Cranbrook.	
Peter, Phillips & Bass.	Williams' Lake.	
Placer Engineers Ltd.	535 Georgia St. W., Vancouver.	
Powell, Julius.	Barkerville.	
Price, C. P.	Beaver Mouth.	
Papich, Tom.	Atlin, B.C.	
Quesnel Mining Co., Ltd.	Rogers Bldg., Vancouver.	
Retan, M., & Co.	Atlin.	

DIRECTORY OF FIRMS—Continued

Alluvial Gold Mining Industry—Concluded

Name	Head office address	Location
BRITISH COLUMBIA—Concluded		
Roach, Eli.	Skookumchuck.	(a)
Scotch Creek Placer Mines, Ltd.	Bank of Commerce Bldg., Winnipeg, Man.	Kamloops, Mining Div.
Slade-Cariboo Gold Placers, Ltd.	1410 Hog Bldg., Seattle, Wash.	Cariboo Mining Div.
Strandberg, E.	Hudson Hope.	Peace River Mining Div.
St. Louis Placers.	c/o L. L. Gordon, Mississippi Valley Trust, St. Louis, Mo.	Cariboo Mining Div.
Sundberg, Magnus.	Wingdam.	Donavon Creek.
Sweet and Moran.	Atlin.	Atlin Mining Div.
Syndicate Mines Ltd.	Vancouver.	Omineca Mining Div.
Taylor & Shore.	Quesnel Hotel, Quesnel.	Quesnel Mining Div.
Trehouse Hydraulic Mining Corp.	Barkerville.	Cariboo Mining Div.
Turnquist, Emil.	Atlin.	Ruby Creek.
Victoria Syndicate.	c/o S. White, 630 Island Road, Oak Bay.	Cedar Creek.
Vik, Alfred.	Atlin.	Atlin Mining Div.
Wing, David L.	Wrangell, Alaska.	Liard Mining Div.
Wooden, E. H.	Atlin.	Atlin Mining Div.
Youngun, R. L.	Likely.	Quesnel Mining Div.
Yukon Border Placer Golds, Ltd.	Suite 930, 25 King St. W., Toronto, Ont.	Atlin Mining Div.
YUKON—		
Holbrook Dredging Co.	Glacier Creek P.O.	Dawson Mining Div.
Inca Mining Co.	3006 Union Guard Bldg., Detroit, Mich., U.S.A.	Iron Creek.
McCormick & Stewart.	Glacier Creek P.O.	Glacier Creek
Yukon Consolidated Gold Corp., Ltd.	140 Wellington St., Ottawa, Ont.	Dawson Mining Div.

NOTE.—In addition to the operators listed, there were numerous others from whom official returns were not received.
(a) Information not available.

Principal Operators(x) in Canadian Auriferous Quartz Mining Industry

NOVA SCOTIA—		
Aulenback, James R.	Bridgewater.	Lunenburg Co.
Avon Gold Mines, Ltd.	276 St. James St., Montreal, Que.	Halifax Co.
Beaver Dam Gold Mines Syndicate.	1244 St. Catherine St., Montreal.	Halifax Co.
*Benvie Gold Mining Co. Ltd.	Middle Musquodoboit.	Halifax Co.
*Cameron & White.	Carleton.	Yarmouth Co.
Consolidated Mining & Smelting Co. of Canada, Ltd.	215 St. James St., Montreal, Que.	Halifax Co.
Deal, Andrew.	Fairview.	Hants Co.
Douglas, L. H.	Caledonia.	Queens Co.
Giffin Gold Mines, Ltd.	702 Federal Bldg., Toronto, Ont.	Guysboro Co.
Gold River Mining Syndicate.	37 Sackville St., Halifax.	Lunenburg Co.
Guysboro Mines Ltd.	Goldenville.	Guysboro Co.
Higgins & Lawlor.	Box 74, Shubenacadie.	Halifax Co.
Hogan, F. J.	Box 610, Halifax.	Hants Co.
Horne, E. D.	Enfield.	Hants Co.
*Lacey Gold Mining Co. Ltd.	Chester Basin.	Lunenburg Co.
Lake Thomas Syndicate, Ltd.	412 Roy Bldg., Halifax.	Halifax Co.
McDonald & Hudson.	Cross Roads County Harbor.	Guysboro Co.
*McLaren, Alex.	East River Road, New Glasgow.	Guysboro Co.
Metals Associates, Ltd.	Box 219, Yarmouth.	Yarmouth Co.
*Meguna Belt Mines, Ltd.	Bridgewater.	Lunenburg Co.
Mineral Industries, Ltd.	Saint John, N.B.	Guysboro Co.
Mines Development Corp.	189 St. John St., Quebec, P.Q.	Hants Co.
Montague Gold Mines, Ltd.	231 St. James St., Montreal, Que.	Halifax Co.
Montreal Mining Co., Ltd.	Mount Uniacke.	Hants Co.
Moose River Gold Mines, Ltd.	Antigonish.	Halifax Co.
*Nova Scotia Gold Mines, Ltd.	Tangier.	Halifax Co.
*Nugold Mining Corp., Ltd.	100 Adelaide St. W., Toronto, Ont.	Lunenburg Co.
Otter Lake Gold Syndicate, Ltd.	10 Dominion Bank Chambers, 394 Bay St., Toronto, Ont.	Guysboro Co.
*Prospectors Associated Activities, Ltd.	c/o R. A. Logan, Ship Harbor Lake.	Halifax Co.
Queens Mines, Ltd.	297 Agricola St., Halifax.	Hants Co.
Richland Gold Mines, Ltd.	97 Ontario St., Stratford, Ont.	Queens Co.
Seal Harbor Gold Mines, Ltd.	57 Bloor St. W., Toronto, Ont.	Guysboro Co.
Stanburn Gold Mine.	c/o J. A. Grant & Co., Box 26, New Germany.	Halifax Co.
United Goldfields of Nova Scotia, Ltd.	Royal Bank Bldg., Liverpool.	Queens Co.
Waverley Consolidated Gold Mines, Ltd.	213 St. James St., Montreal, Que.	Halifax Co.
QUEBEC—		
*Adanac-Quebec Mines Ltd.	601-330 Bay St., Toronto, Ont.	Rouyn Tp.
*Adanac Gold Syndicate.	601-330 Bay St., Toronto, Ont.	Vauquelin Tp.
*Adeline Lake Gold Mines, Ltd.	2408 Stanley St., Niagara Falls, Ont.	Beauchastel Tp.
*Admiral Cadillac Gold Mines, Ltd.	100 Adelaide St. W., Toronto, Ont.	Cadillac Tp.
*Agaura Explorations, Ltd.	105 St. James St. W., Montreal.	N.W. Quebec.
*Amm Gold Mines, Ltd.	80 King St. W., Toronto, Ont.	Cadillac Tp.
*Amos-Cadillac Gold Mines, Ltd.	330 Bay St., Toronto, Ont.	Cadillac Tp.
*Ardmore Properties, Ltd.	710 Excelsior Bldg., Toronto, Ont.	Wedding River Area.
*Arnoceur Gold Mines, Ltd.	Arntfield.	Dasserau Tp.
Arntfield Gold Mines, Ltd.	Arntfield.	Beauchastel Tp.

DIRECTORY OF FIRMS—Continued

Principal Operators (x) in Canadian Auriferous Quartz Mining Industry—Continued

Name	Head office address	Location
QUEBEC—Continued		
*Arrowhead Gold Mines, Ltd.	240 St. James St. W., Montreal	Joannes Tp.
*Ascot Gold Mines, Ltd.	357 Bay St., Toronto, Ont.	Malartic Tp.
*Astoria Rouyn Mines, Ltd.	Hull	Rouyn Tp.
*Avacolon Mining Syndicate	67 Yonge St., Toronto, Ont.	Vauquelin Tp.
*Beattie Gold Mines, Ltd.	25 King St. W., Toronto, Ont.	Duparquet Tp.
*Beaucourt Gold Mines, Ltd.	1604 Aldred Bldg., Montreal	Louvicoourt Tp.
*Beaufor Mining Corporation	Pascal	Pascal Tp.
Belleterre Mines, Ltd.	15 King St. W., Toronto, Ont.	Guillet Tp.
*Bickleigh Mining Co., Ltd.	603 Royal Bank Bldg., Toronto, Ont.	Dasserat Tp.
*Blouin Lake Gold Mines, Ltd.	516 Canada Cement Bldg., Montreal	Bourlamaque Tp.
*Bourbeau Lake Chibougamau Mines, Ltd.	New Liskeard, Ont.	McKenzie Tp.
*Bourlamaque Gold Developments, Ltd.	726 Insurance Exchange Bldg., Montreal	Bourlamaque Tp.
*Bouscadillac Gold Mines, Ltd.	85 Richmond St. W., Toronto, Ont.	Bousquet Tp.
*Brown Bousquet Mines, Ltd.	437 St. James St. W., Montreal	Cadillac Tp.
*Bruell Gold Syndicate, Ltd.	330 Bay St., Toronto, Ont.	Vauquelin Tp.
Canadian Malartic Gold Mines, Ltd.	25 King St. W., Toronto, Ont.	Fourniere Tp.
*Candalea Gold Mines, Ltd.	18 Toronto St., Toronto, Ont.	Cadillac Tp.
*Capital Rouyn Gold Mines, Ltd.	301 First Ave., Ottawa, Ont.	Roy and McKenzie Tps.
*Capital Traders, Ltd.	276 St. James St. W., Montreal	Various.
*Cache Lake Chibougamau Mines, Ltd.	132 St. James St. W., Montreal	Obalski Tp.
*Celta Development & Mining Co., Ltd.	509 Lewis Bldg., Montreal	Sennerville and Malartic Tps.
*Central Cadillac Gold Mines, Ltd.	132 St. James St. W., Montreal	Cadillac Tp.
*Central Gold Mines	Pictou, Ont.	Dasserat Tp.
*Central Chibougamau Mines, Ltd.	276 St. James St., Montreal	Chibougamau Dist.
*Centrecour Gold Mines, Ltd.	350 Bay St., Toronto, Ont.	Louvicoourt Tp.
*Ceres Explorations, Ltd.	85 Sparks St., Ottawa, Ont.	Various.
*Chibmac Mines, Ltd.	132 St. James St. W., Montreal	Barlow and Scott Tps.
*Chibougamau Properties, Ltd.	132 St. James St. W., Montreal	Chibougamau Dist.
*Chieftain Gold Mines, Ltd.	26 Queen St. E., Toronto, Ont.	Tiblemont Tp.
*Clericy Consolidated Gold Mines, Ltd.	74 Sparks St., Ottawa, Ont.	Rouyn Tp.
*Clerno Mines, Ltd.	74 Sparks St., Ottawa, Ont.	Rouyn Tp.
*Consolidated Chibougamau Goldfields, Ltd.	215 St. James St., Montreal	McKenzie Tp.
*Consolidated Mining & Smelting Company of Canada, Ltd.	215 St. James St., Montreal	Chibougamau and Vauquelin Tps.
*Deane-Cadillac Mining Corp.	276 St. James St., Montreal	Amos.
*Dempsey-Cadillac Gold Mines, Ltd.	1008 Royal Bank Bldg., Toronto, Ont.	Cadillac and Malartic Tps.
*Descar Corporation, Ltd.	231 St. James St. W., Montreal	Destor Tp.
*Dileas Syndicate	92 Second Ave., Noranda	Dasserat Tp.
*Doreva Gold Mines, Ltd.	330 Bay St., Toronto, Ont.	Bousquet Tp.
*Dorrington Mining Syndicate	2408 Stanley St., Niagara Falls, Ont.	Beauchastel Tp.
*Dorval-Siscoe Gold Mines, Ltd.	34 Adelaide St. W., Toronto, Ont.	Varsan Tp.
*Dubuison Goldfields, Ltd.	726 Insurance Exchange Bldg., Montreal	Dubuison Tp.
*Dubuison Mines, Ltd.	517 Canada Cement Bldg., Montreal	Dubuison Tp.
*Dubuque Mines, Ltd.	Marshall-Ecclestone Block, Third Ave., Timmins, Ont.	Dubuison Tp.
*Duquesne Mines, Ltd.	80 King St. W., Toronto, Ont.	Duparquet and Destor Tps.
*Durbar Gold Mines, Ltd.	Box B, Edgewood, Rhode Island, U.S.A.	Rouyn Tp.
*East Bay Gold, Ltd.	Rouyn	Rouyn Tp.
*East Malartic Mines, Ltd.	Box 667, Montreal	Fourniere Tp.
*Eastwest Exploration Co., Ltd.	465 St. James St., Montreal	Dubuison Tp.
*Embergold Mines, Ltd.	956 New Birks Bldg., Montreal	Ditton Tp.
*Emperor Gold Syndicate, Ltd.	Suite 704, General Association Bldg., Bay St., Toronto, Ont.	Ducros Tp.
*Erie Canadian Mines, Ltd.	Box 670, Kirkland Lake, Ont.	Bourlamaque Tp.
*Fontana Gold Mines, Ltd.	1022 Transportation Bldg., Montreal	Duverney Tp.
*Florence River (Quebec) Gold Mines, Ltd.	320 Bay St., Toronto, Ont.	Desjardins and Franquet Tps.
*Francoeur Gold Mines, Ltd.	941 Dominion Square Bldg., Montreal	Beauchastel Tp.
*Fregold Mines, Ltd.	45 St. James St., Montreal	Launay Tp.
*Gale Gold Mines, Ltd.	489 Oullette Ave., Windsor, Ont.	Dubuison Tp.
*Garth Chiboug Gold Syndicate, Ltd.	320 Bay St., Toronto, Ont.	Chibougamau Tp.
*Gilbee Mines, Ltd.	200 Bay St., Toronto, Ont.	Pascal Tp.
*Glenau Mining Co., Ltd.	920 Castle Bldg., Montreal	Rouyn Tp.
*Gold Mining Claims, Ltd.	132 St. James St., Montreal	Duverney Tp.
*Golden Manitou Syndicate	48 Sparks St., Ottawa, Ont.	Bourlamaque Tp.
*Gold Quartz Mining Corp., Ltd.	28 Queen St. E., Toronto, Ont.	Courville Tp.
Granada Gold Mines	244 Bay St., Toronto, Ont.	Rouyn Tp.
Greene-Stabell Mines, Ltd.	Val d'Or	Dubuison Tp.
*Halliwell Gold Mines, Ltd.	360 rue St. Jacques, Montreal	Beauchastel Tp.
*Harricana Amalgamated Gold Mines, Inc.	220 Grande Allée	Dubuison Tp.
*Harricana Basin Mining Co.	Box B, Amos	Various.
*Hayer Cadillac Mines, Ltd.	18 Toronto St., Toronto, Ont.	Cadillac Tp.
*Hollinger Consolidated Gold Mines, Ltd.	Timmins, Ont.	Waswanipi Area.
*International Mining Corp. (Canada), Ltd.	85 Richmond St. W. Toronto, Ont.	Various Tps.
*Joannes Mine Corporation, Ltd.	276 St. Jacques, Montreal	Joannes Tp.
*Jupiter Gold Syndicate, Ltd.	330 Bay St., Toronto, Ont.	Rouyn Tp.
*Kewagama Gold Mines, Ltd.	25 King St. W., Toronto, Ont.	Kewagama Tp.
*Keyroc Gold Mining Co., Ltd.	288 Bay St., Toronto, Ont.	Rouyn Tp.
*Kienna Gold Mines, Ltd.	302 Bay St., Toronto, Ont.	Dubuison Tp.
*Kindale Mines, Ltd.	217 University Tower, Montreal	Rouyn Tp.
*Kirkland-Hudson Bay Gold Mines, Ltd.	New Liskeard, Ont.	Blondeau and Guillet Tps.
*Lacoma Gold Mines, Ltd.	372 Bay St., Toronto, Ont.	Jurie and Tavern Tps.
*Lake Dasserat Mines, Ltd.	304 Bay St., Toronto, Ont.	Dasserat Tp.

DIRECTORY OF FIRMS—Continued

Principal Operators (x) in Canadian Auriferous Quartz Mining Industry—Continued

Name	Head office address	Location
QUEBEC—Continued		
*Lake Expansé Gold Mines, Ltd.	320 Bay St., Toronto, Ont.	Guillet Tp.
*Lake Rose Mines, Ltd.	80 King St. W., Toronto, Ont.	Currie Tp.
*Lamaque Contact Gold Mines, Ltd.	357 Bay St., Toronto, Ont.	Bourlamaque Tp.
*Lamaque Gold Mines, Ltd.	Bourlamaque.	Bourlamaque Tp.
*La Reine Gold Mines, Ltd.	305 C.P.R. Bldg., Toronto, Ont.	La Reine Tp.
*Lapa Cadillac Gold Mines, Ltd.	25 King St. W., Toronto, Ont.	Cadillac Tp.
*La Sarre Gold Mines, Ltd.	304 C.P.R. Bldg., Toronto, Ont.	La Sarre Tp.
*Launayor Syndicate, Ltd.	445 rue St. Francois-Xavier, Montreal.	Dubuisson Tp.
*Le Roy Mines, Ltd.	266 Ouest rue St. Jacques, Montreal.	Rouyn Tp.
*Louvre Gold Mines, Ltd.	407 McGill St., Montreal.	Louvencourt Tp.
*Malartic Goldfields, Ltd.	Box 667, Montreal.	Fourniere, Dubuisson and Malartic Tps.
*Malartic Lake Shore Mines, Ltd.	276 St. James St., Montreal.	Malartic Tp.
*Maritime Cadillac Gold Mines, Ltd.	330 Bay St., Toronto, Ont.	Cadillac Tp.
*Maritime Cadillac Syndicate.	Moncton, N.B.	Cadillac Tp.
*Mines Syndicat d'Or Marchi Maitou Ltée.	220 Grande Allée.	Pershing Tp.
*McDonough Mining Syndicate, Ltd.	67 Yonge St., Toronto, Ont.	Vauquelin Tp.
*McIntyre Porcupine Mines, Ltd.	15 King St. W., Toronto, Ont.	Guillet and Dasserat Tps.
*McKay (Quebec) Explorations, Ltd.	215 St. James St., Montreal.	Scott and Lemoine Tps.
*McRae Gold Mines, Ltd.	132 St. James St. W., Montreal.	Varsan Tp.
*McWatters Gold Mines, Ltd.	Drawer 988, Haileybury, Ont.	Rouyn Tp.
*Midcure Prospects, Ltd.	906 Central Bldg., Toronto, 2, Ont.	Louvencourt Tp.
*Midland Mining Corp., Ltd.	31 St. James St. W., Montreal.	Desmeloizes Tp.
*Mines Development Corp.	189 rue St. Jean, Quebec.	Landrienne Tp.
*Minerseeker Forgold, Ltd.	Box 184, Rouyn.	Rouyn and Destor Tps.
*Mines Operating Corporation.	King St., West Hanover, Mass., U.S.A.	Cadillac Tp.
*Mining Corporation of Canada, Ltd.	350 Bay St., Toronto 2, Ont.	Various.
*Mining Enterprises, Ltd.	206 Coronation Bldg., Montreal.	Malartic Tp.
*Monarch Mines, Ltd.	330 Bay St., Toronto, Ont.	Dasserat Tp.
*Moosha Gold Mines Co., Ltd.	25 King St. W., Toronto, Ont.	Bousquet Tp.
*MyLamaque Gold Mines, Ltd.	10 Adelaide St. E., Toronto, Ont.	Bourlamaque Tp.
*Norgold Mines, Ltd.	25 King St. W., Toronto, Ont.	Bousquet Tp.
*Northern Quebec Goldfields & Exploration Co.	Three Rivers.	Bousquet Tp.
*North King Gold Syndicate.	1 Toronto St., Toronto, Ont.	Tavernier and Haig Tps.
*Nortrac Mining Co., Ltd.	210 St. James St. W., Montreal.	Dalquier Tp.
*Nubell Gold Mines, Ltd.	215 St. James St. W., Montreal.	Louvencourt and Vauquelin Tps.
*Numaque Mining Co.	465 St. John St., Montreal.	Bourlamaque Tp.
*O'Brien Gold Mines, Ltd.	Kewagama.	Cadillac Tp.
*Olympic Cadillac Gold Mines, Ltd.	1112 Star Bldg., Toronto, Ont.	Cadillac Tp.
*O'Neill Thompson Gold Mines, Ltd.	Box 734, Ottawa, Ont.	Joannes Tp.
*Pan Canadian Gold Mines, Ltd.	407 McGill St., Montreal.	Cadillac Tp.
*Pandora Cadillac Gold Mines, Ltd.	New Liskeard, Ont.	Cadillac Tp.
*Pascalis Gold Mines, Ltd.	25 King St. W., Toronto, Ont.	Pascalis and Louvencourt Tps.
*Payore Gold Mines, Ltd.	357 Bay St., Toronto, Ont.	Bourlamaque Tp.
*Perron Gold Mines, Ltd.	Box 59, Perron, Ont.	Senneville and Pascalis Tps.
*Pershing Gold Exploration, Ltd.	100 Adelaide St. W., Toronto, Ont.	Pershing and Franquet Tps.
*Plandor Mines Co.	20 St. Jacques Est., Montreal.	Cadillac Tp.
*Poulin Mining Co., Ltd.	48 rue Fort, St. Lambert, Montreal.	Ascot Tp.
*Prospectors Airways Co., Ltd.	80 King St. W., Toronto, Ont.	N. W. Quebec.
*Quebec Eureka Gold Mines, Ltd.	30 Adelaide St. W., Toronto, Ont.	Tiblemont Tp.
*Quebec La Pauze Gold Mines, Ltd.	426 McGill St., Montreal.	La Pauze Co.
*Ramsey Gold Mines, Ltd.	27 St. John St., Quebec.	Clermont Tp.
*Red Gold Mining Co., Ltd.	159 Craig St. W., Montreal.	Rouyn Tp.
*Richard Exploration Co., Ltd.	132 St. James St. W., Montreal.	Various.
*Rochette Gold Mines Co., Ltd.	Box 29, Taschereau.	Launay Tp.
*Rosego Development Co., Ltd.	210 St. James St. W., Montreal.	Rouyn Tp.
*Routhier Cadillac Gold Mines, Ltd.	266 St. James St. W., Montreal.	Rouyn, Cadillac and Duvernay Tps.
*Rubec Mines, Ltd.	276 St. James St., Montreal.	Cadillac and Scott Tps.
*St. Pierre Cadillac Gold Mines, Ltd.	507 Place d'Armes, Montreal.	Cadillac Tp.
*Senator Mines, Ltd.	187 Main St., Hull.	Rouyn Tp.
*Senore Gold Mines, Ltd.	357 Bay St., Toronto, Ont.	Senneville and Pascalis Tps.
*Shawkey Gold Mining Co., Ltd.	Shawkey.	Dubuisson Tp.
*Sigma Mines, Ltd.	Bourlamaque.	Bourlamaque Tp.
*Simmons Mining Co., Ltd.	266 St. James St. W., Montreal.	Rouyn Tp.
*Sim Cler Gold Mines, Ltd.	84 Notre Dame St. W., Montreal.	Louvencourt Tp.
*Siscoe Extension Gold, Ltd.	25 King St. W., Toronto, Ont.	Varsan and Dubuisson Tps.
*Siscoe Gold Mines, Ltd.	Dominion Square Bldg., Montreal.	Varsan and Dubuisson Tps.
*Sladen-Malartic Mines, Ltd.	63 Sparks St., Ottawa, Ont.	Cadillac and Fournier Tps.
*Smith Tiblemont, Ltd.	Senneville.	Tiblemont Tp.
*South Malartic Gold Mines, Ltd.	231 St. James St. W., Montreal.	Fourniere Tp.
*Standard Gold Mines, Ltd.	1604 Aldred Bldg., 507 Place d'Armes, Montreal.	Bourlamaque.
*Stadacona Rouyn Mines, Ltd.	719 Tramways Bldg., Montreal.	Rouyn Tp.
*Sturgeon Goldfields, Ltd.	341 Dominion Square Bldg., Montreal.	Destor Tp.
*Sullivan Consolidated Mines, Ltd.	1604 Aldred Bldg., Montreal.	Dubuisson Tp.
*Teck-Hughes Gold Mines, Ltd.	Kirkland Lake, Ont.	Joannes Tp.
*Thompson Cadillac Mining Corp.	1335 Bell Telephone Bldg., Montreal.	Cadillac Tp.
*Tiblemont Island Mining Co., Ltd.	Senneville.	Tiblemont Tp.
*Tonawanda Mines, Ltd.	Rouyn.	Cadillac Tp.
*True Fissure Mines, Ltd.	477 St. Francois-Xavier St., Montreal.	Cadillac and Dubuisson Tps.
*United Gold Exploration, Ltd.	276 St. James St. W., Montreal.	Laverlochere.

DIRECTORY OF FIRMS—Continued

Principal Operators (x) in Canadian Auriferous Quartz Mining Industry—Continued

Name	Head office address	Location
QUEBEC—Continued		
*Vipond-Cameron Mines, Ltd.	276 St. James St. W., Montreal	Rouyn Tp.
*Val d'Or Mineral Holdings, Ltd.	Val d'Or	Bourlamaque.
*Ventures Mines, Ltd.	330 Bay St., Toronto, Ont.	Guilet Tp.
*Vantage, Ltd.	25 King St. W., Toronto, Ont.	Dufresnoy and Rouyn Tps.
*Wahu Mines, Ltd.	Semeterre	Tibémont Tp.
*Wawbano Mines, Ltd.	824 Royal Bank Bldg., Montreal	Chibougamau Dist.
*Westwood Cadillac Mines, Ltd.	1430 St. James St. W., Montreal	Amos.
*West Shore Malartic Gold Mines	447 St. Catherine St. W., Montreal	Dubuisson Tp.
*Wisik Gold Mines, Ltd.	302 Bay St., Toronto, Ont.	Dubuisson Tp.
*Wood Cadillac Mines, Ltd.	437 St. James St. W., Montreal	Cadillac Tp.
*Wedding River Gold Mines, Ltd.	67 Yonge St., Toronto, Ont.	Desjardins Tp.
*West Flo Gold Mines, Ltd.	67 Yonge St., Toronto, Ont.	Desjardins Tp.
*Ypres Cadillac Mines, Ltd.	171 Yonge St., Toronto, Ont.	Cadillac Tp.
ONTARIO—		
*Alcona Mines, Ltd.	372 Bay St., Toronto	Alcona.
Algold Mines, Ltd.	45 Richmond St. W., Toronto	Goudreau.
Anglo Summit Gold Mines, Ltd.	514 McKinnon Bldg., Toronto	Goudreau.
Anglo-Huronian, Ltd.	80 King St. W., Toronto	Porcupine.
*Aquareius Porcupine Gold Mines, Ltd.	706 Concourse Bldg., Toronto	Porcupine.
*Arbade Gold Mines, Ltd.	10 Adelaide St. E., Toronto	Matachewan.
Ardeen Gold Mines, Ltd.	132 St. James St. W., Montreal, Que.	Kashabowie.
Argosy Gold Mines, Ltd.	44 Victoria St., Toronto	Dist. of Patricia.
Ashley Gold Mining Corp., Ltd.	350 Bay St., Toronto	Matachewan.
*Aughtie Porcupine Mines, Ltd.	357 Bay St., Toronto	Deloro.
*Bankfield Consolidated Mines, Ltd.	1006 Concourse Bldg., Toronto	Thunder Bay.
Barry Hollinger Gold Mines	57 Bloor St. W., Toronto	Boston Creek.
*Berens River Mines, Ltd.	Empire	Dist. of Patricia.
Bigdoo Kirkland Gold Mines, Ltd.	Suite 602, 350 Bay St., Toronto	Lebel Tp.
*Black Eagle Red Lake Mines, Ltd.	200 Bay St., Toronto	Red Lake.
Bloom Lake Consolidated Mines, Ltd.	300 Bay St., Toronto	(a)
Bourkes Syndicate	Bourkes	Temiskaming.
Bousquet Gold Mines, Ltd.	Suite 32, 131 Yonge St., Toronto	Sudbury Dist.
*Brae-Breest Gold Mines, Ltd.	904 C.P.R. Bldg., 67 Yonge St., Toronto	Kenora.
*Bregold Mines, Ltd.	34 King St. W., Toronto	Thunder Bay.
*Brennan & Kenty Bros. Prospecting Co.	44 Victoria St., Toronto	Various.
Buffalo Ankerite Gold Mines, Ltd.	1728 Rand Bldg., Buffalo, N.Y., U.S.A.	South Porcupine.
Car Lake Syndicate	519 Ottawa Electric Bldg., Ottawa	Narrow Lake.
Central Matachewan Mining Corp.	330 Bay St., Toronto	Matachewan.
Central Patricia Gold Mines, Ltd.	1001 Federal Bldg., Toronto	Dist. of Patricia.
*Central Porcupine Mines, Ltd.	1620 Bank of Commerce Building, Toronto	Algoma.
*Cline Lake Gold Mines, Ltd.	Box 939, Cobalt	Porcupine.
*Cochenour Willans Gold Mines, Ltd.	801 Dominion Bank Bldg., Toronto	Dist. of Patricia.
Cone, Russell C.	Mine Centre	Mine Centre.
Conisaurum Mines, Ltd.	25 King St. W., Toronto	Porcupine.
*Consolidated Mining & Smelting Company of Canada, Ltd.	215 St. James St. W., Montreal, Que.	Temagami, Cordova, Ritchie, Addington and New Golden Rose Mines.
*Coulson Consolidated Gold Mines, Ltd.	1809 Royal Bank Bldg., Toronto	Coulson Tp.
*Darkwater Mines, Ltd.	85 Richmond St. W., Toronto	Kenora.
Deep Lake Gold Mines	Gold Park	Algoma.
*Deloro-Wright Syndicate	806 Dun Bldg., Buffalo, N.Y., U.S.A.	Deloro.
*Delnite Mines, Ltd.	603 Royal Bank Bldg., Toronto	Porcupine.
*Delwood Porcupine Gold Mines, Ltd.	330 Bay St., Toronto	Porcupine.
Dome Mines, Ltd.	36 Toronto St., Toronto	Porcupine.
*Dona Patricia Gold Mines, Ltd.	320 Bay St., Toronto	Dist. of Patricia.
*Dumond Mining & Exploration Co., Ltd.	Haileybury	Various.
Duport Mining Co., Ltd.	404 Public Utilities Bldg., North Bay	Shoal Lake.
*East Bay Mines of Red Lake, Ltd.	330 Bay St., Toronto	Red Lake.
*Edgelake Gold Mining Co., Ltd.	Box 128, Schumacher	Tashota.
*Edina Gold Syndicate	40 Fifth St., Chatham	Michipicoten.
*Electra Porcupine Gold Mines, Ltd.	29 Melinda St., Toronto	Macklem Tp.
*Elizabeth Gold Mining Co., Ltd.	9 Adelaide St. E., Toronto	Atikokan.
*Elmos Gold Mines, Ltd.	171 Yonge St., Toronto	Long Lac Dist.
Elora Gold Mines, Ltd.	4 Royal Bank Bldg., Toronto	Goldrock.
*Empire Gold Mines, Ltd.	204 McKinnon Bldg., Toronto	Porcupine.
Darwin Gold Mines, Ltd.	304 Bay St., Toronto	Michipicoten.
*Erie Canadian Mines, Ltd.	Box 670, Kirkland Lake	Red Lake.
*Excelsior Gold Mines, Ltd.	26 Richmond St. W., Toronto	Temagami.
*Falcongold Mines, Ltd.	200 Bay St., Toronto	Sudbury Dist.
*Franklin Gold Mines, Ltd.	1112 Canada Permanent Bldg., Toronto	Haycock Tp.
*Frontier Red Lake Gold Mines, Ltd.	701 National Bldg., Toronto	Dist. of Patricia.
*Gateway Patricia Gold Mines, Ltd.	330 Bay St. Toronto	Pickle Lake.
*Geraldton Longlac Gold Mines, Ltd.	200 Bay St., Toronto	Hutchison Lake.
Gillies Lake Porcupine Gold Mines, Ltd.	9 Toronto St., Toronto	Porcupine.
*Glenora Gold Mines, Ltd.	85 Richmond St. W., Toronto	Temiskaming.
*Goldbanks-Kirkland Mines, Ltd.	361 Richmond St., London	Larder Lake.
*Goldcrest Mines, Ltd.	1306 Star Bldg., Toronto	Port Arthur Dist.
*Gold Eagle Gold Mines, Ltd.	357 Bay St., Toronto	Red Lake.
*Golden Arm Mines, Ltd.	702 National Bldg., Toronto	Dist. of Patricia.
*Golden Gate Mining Co., Ltd.	59 Yonge St., Toronto	Temiskaming.
Golden Summit Mines, Ltd.	2374 Bloor St. W., Toronto	Sesekinika.
*Gold Range Mines, Ltd.	203 Royal Bank Bldg., Toronto	Schreiber.

DIRECTORY OF FIRMS—Continued

Principal Operators (x) in Canadian Auriferous Quartz Mining Industry—Continued

Name	Head office address	Location
ONTARIO—Continued		
*Golden Trinity Mines, Ltd.	255 Bay St., Toronto	Red Lake.
Gomak Mines, Ltd.	320 Bay St., Toronto	Chester Tp.
*Gordon-Lebel Mines, Ltd.	67 Yonge St., Toronto	Lebel Tp.
*Hallnor Mines, Ltd.	804 Royal Bank Bldg., Toronto	Whitney Tp.
*Hard Rock Gold Mines, Ltd.	608 Royal Bank Bldg., Toronto	Geraldton.
*Hargreaves Kirkland Gold Mines, Ltd.	402 Atlas Bldg., Toronto	Larder Lake.
*Harkness-Hays Gold Mines, Ltd.	310 Temple Bldg., Toronto	Schreiber.
*Harwood Lake Mines, Ltd.	21 King St. W., Toronto	Sudbury Dist.
*Hillside Mines, Ltd.	244 Bay St., Toronto	Algoma.
Hollinger Consolidated Gold Mines, Ltd.	Timmins	Porcupine, Hislop, Powell, Whitney and Arden Tps.
Howey Gold Mines, Ltd.	Red Lake	Red Lake.
Hudson Patricia Gold Mines, Ltd.	112 Yonge St., Toronto	Woman Lake Area.
*Hugh-Pam Porcupine Mines, Ltd.	51 King St. W., Toronto	Porcupine.
*Hutchison Lake Gold Mines, Ltd.	200 Bay St., Toronto	Hutchison Lake.
*Imperial Reserve Mines, Ltd.	67 Yonge St., Toronto	Lightning River.
*Interlac Gold Ltd.	c/o Harley, Sweet & Slemm, Brantford	Longlac Dist.
J. M. Consolidated Gold Mines, Ltd.	1116 Federal Bldg., Toronto	Dist. of Patricia.
*Jowsey Denton Gold Mines, Ltd.	372 Bay St., Toronto	Temiskaming.
*Kaw-Crow Patricia Gold Mines, Ltd.	801 Excelsior Life Bldg., 36 Toronto St., Toronto	Lake-of-the-Woods.
Kenland Gold Mines, Ltd.	801 Excelsior Life Bldg., 36 Toronto St., Toronto	Lake-of-the-Woods.
*Kenogamis Gold Mines, Ltd.	357 Bay St., Toronto	Geraldton.
*Kenora Prospectors & Miners, Ltd.	2810 Bank of Commerce Bldg., Toronto	Shoal Lake.
*Kenricia Gold Mines, Ltd.	25 King St. W., Toronto	Dist. of Kenora.
*Kerr-Addison Gold Mines, Ltd.	38 King St. W., Toronto	Larder City Tp.
*Kirkking Mines, Ltd.	902 Kent Bldg., Toronto	Temiskaming.
*James Kirkland Mines, Ltd.	36 Toronto St., Toronto	Larder Lake.
*Kirana Kirkland Gold Mines, Ltd.	1009 Royal Bank Bldg., Toronto	Kirkland Lake.
*Kirkland Gold Road, Ltd.	1812 Royal Bank Bldg., Montreal, Que.	Teck Tp.
*Kirkland-Hudson Gold Mines, Ltd.	New Liskeard	Black and Teck Tps.
*Kirkland Lake Gold Mining Co., Ltd.	314 Metropolitan Bldg., Toronto	Kirkland Lake.
*Lafayette Longlac Gold Mines, Ltd.	200 Bay St., Toronto	Hutchison Lake.
*Lac-Teck Gold Mines, Ltd.	200 Bay St., Toronto	Hutchison Lake.
*Lake Caswell Mines, Ltd.	1465 Yonge St., Toronto	Shining Tree.
*Lake Head Gold Mines, Ltd.	200 Bay St., Toronto	Gorham Tp.
*Lake Rowan Gold Mines, Ltd.	1178 Phillips Place, Montreal, Que.	Red Lake.
*Lake Shore Mines, Ltd.	Kirkland Lake	Kirkland Lake.
*Lebel Ore Mines, Ltd.	320 Bay St., Toronto	Naughton.
Leitch Gold Mines, Ltd.	1213 Canada Permanent Bldg., Toronto	Thunder Bay Dist.
Little Long Lac Gold Mines, Ltd.	25 King St. W., Toronto	Thunder Bay Dist.
*Luna d'Or Mines, Ltd.	193 Sparks St., Ottawa	Narrow Lake.
*Luxor Red Lake Mines, Ltd.	705 National Bldg., Toronto	Kenora Dist.
*MacAndrew Red Lake Gold Mines, Ltd.	100 Adelaide St. W., Toronto	Dist. of Patricia.
Macassa Mines, Ltd.	1001 Federal Bldg., Toronto	Kirkland Lake.
*MacJoe Sturgeon Gold Mines, Ltd.	67 Yonge St., Toronto	Sturgeon River.
*Mackey Point Gold Mines, Ltd.	266 St. James St. W., Montreal, Que.	Algoma.
*MacLeod-Cockshutt Gold Mines, Ltd.	357 Bay St., Toronto	Thunder Bay.
*Madsen Red Lake Gold Mines, Ltd.	67 Yonge St., Toronto	Red Lake.
*Magnet Consolidated Mines, Ltd.	347 Bay St., Toronto	Geraldton.
*Manitoba Basin Mining Co., Ltd.	200 Bay St., Toronto	Hutchison Lake.
*Manitoba & Eastern Mines, Ltd.	709 Excelsior Life Bldg., Toronto	Temagami.
*Margaret Red Lake Mines, Ltd.	320 Bay St., Toronto	Red Lake.
*Marquette Longlac Gold Mines, Ltd.	200 Bay St., Toronto	Geraldton.
*Martin Bird Gold Mines, Ltd.	200 Bay St., Toronto	Temiskaming.
Matatchewan Consolidated Mines, Ltd.	25 King St. W., Toronto	Temiskaming.
*May-Spiers Gold Mines, Ltd.	350 Bay St., Toronto	Dist. of Patricia.
McIntyre Porcupine Gold Mines, Ltd.	Schumacher	Dist. of Cochrane.
McKenzie Red Lake Gold Mines, Ltd.	705 National Bldg., Toronto	Dist. of Patricia.
*McLaren Porcupine Gold Mines, Ltd.	Box 514, South Porcupine	Dist. of Cochrane.
*McEllan Longlac Gold Mines, Ltd.	29 Commercial St., Leaside	Errington.
*McMillan Gold Mines, Ltd.	Mackey Block, Sudbury	Dist. of Sudbury.
*Melba Gold Mines, Ltd.	388 St. James St., Montreal, Que.	Bourkes.
*Milmac Mines, Ltd.	612 Queen St. E., Sault Ste. Marie	Algoma.
*Mineral Estates, Ltd.	34 King St. E., Toronto	Timmins.
Minto Gold Mines, Ltd.	Wawa	Algoma.
*Moffat Hall Mining Co., Ltd.	357 Bay St., Toronto	Kirkland Lake.
Morris Kirkland Gold Mines, Ltd.	902 Kent Bldg., Toronto	Lebel Tp.
*Mosher Longlac Gold Mines, Ltd.	320 Bay St., Toronto	Long Lac.
*Murray-Algoma Mining Co., Ltd.	18 Lansdowne Ave., Sault Ste. Marie	Algoma Tp.
*Muton Long Lac Gold Mines, Ltd.	26 Queen St. E., Toronto	Kenora Dist.
*Naybob Gold Mines, Ltd.	85 Richmond St. E., Toronto	Porcupine Dist.
*Nordarm Longlac Mines, Ltd.	44 Victoria St., Toronto	Little Long Lac.
Northern Empire Mines Co., Ltd.	Empire	Empire.
North Shore Mines (1936), Ltd.	1022 Federal Bldg., Toronto	Schreiber.
*North Whitney Mines, Ltd.	330 Bay St., Toronto	Porcupine.
*Old Diamond Gold Mines, Ltd.	74 King St. E., Toronto	Hastings Co.
Omega Gold Mines, Ltd.	Larder Lake	McVittie Tp.
*Oremont Gold Mines, Ltd.	347 Bay St., Toronto	Jellicoe.
*Oriole Mines, Ltd.	45 Richmond St. W., Toronto	Kirkland Lake.
Pamour Porcupine Mines, Ltd.	Pamour	Dist. of Cochrane.
Parkhill Gold Mines, Ltd.	Beaver Hall Bldg., Montreal, Que.	Gold Park.
*Paulore Gold Mines, Ltd.	357 Bay St., Toronto	Red Lake.

DIRECTORY OF FIRMS—Continued

Principal Operators (x) in Canadian Auriferous Quartz Mining Industry—Continued

Name	Head office address	Location
ONTARIO—Concluded		
Paymaster Consolidated Mines, Ltd.	South Porcupine	Deloro and Tisdale Tp.
Pickle Crow Gold Mines, Ltd.	Pickle Crow	Dist. of Patricia.
*Porcupine Carshaw Gold Mining Syndicate	Box 515, South Porcupine	Dist. of Cochrane.
*Porcupine Lake Gold Mining Co., Ltd.	112 Yonge St., Toronto	Porcupine.
*Porcupine McNabb Gold Mines, Ltd.	Haileybury	Porcupine.
*Porcupine Triumph Gold Mines, Ltd.	812 Kent Bldg., Toronto	Porcupine.
*Porcupine Watborn Gold Mines, Ltd.	330 Bay St., Toronto	Porcupine.
*Portage Long Lac Mines, Ltd.	506 Federal Bldg., Toronto	Little Long Lac.
*Presdor Porcupine Gold Mines, Ltd.	9 Toronto St., Toronto	Porcupine.
*Preston East Dome Mines, Ltd.	706 Concourse Bldg., Toronto	South Porcupine.
*Prospectors Airways Co., Ltd.	80 King St. W., Toronto	Various.
*Provincial Developments, Ltd.	204 Notre Dame St. W., Montreal, Que.	Tyrell Tp.
*Rahill Red Lake Mining Co., Ltd.	1004 Bank of Hamilton Bldg., Toronto	Red Lake.
*Ramore Gold Mining Co. Ltd.	305 C.P.R. Bldg., Toronto	Dist. of Cochrane.
Red Crest Gold Mines, Ltd.	1178 Phillip's Place, Montreal, Que.	Dist. of Patricia.
Red Lake Gold Shore Mines, Ltd.	350 Bay St., Toronto	Red Lake.
*Regal Kirkland Gold Mines, Ltd.	330 Bay St., Toronto	Kirkland Lake.
*Richmac Gold Mines (1936), Ltd.	Room 1502, Sterling Tower, Toronto	Red Lake.
*Rickard Ramore Gold Mines, Ltd.	601 Concourse Bldg., Toronto	Rickard Tp.
*Roche Longlac Gold Mines, Ltd.	611 Sterling Tower, Toronto	Little Long Lac.
*Rouge d'Or Mines Ltd.	244 Bay St., Toronto	Red Lake.
*Rowan Red Lake Gold Mines, Ltd.	1404 Aldred Bldg., Place d'Armes, Montreal, Que.	Ball Tp.
*Sand River Gold Mining Co., Ltd.	302 Bay St., Toronto	Beardmore.
*Sanshaw Mines, Ltd.	603 Northern Ontario Bldg., Toronto	Red Lake.
*Savant Sturgeon Gold Mines, Ltd.	314 Metropolitan Bldg., Toronto	Thunder Bay.
*Schreiber Pyramid Gold Mines, Ltd.	372 Bay St., Toronto	Thunder Bay.
*Security Gold Mines, Ltd.	Uxbridge	Dave.
*Skookum Gold Mines, Ltd.	244 Bay St., Toronto	Dist. of Patricia.
*Siville-Perrier Syndicate, Ltd.	403 Kent Bldg., Toronto	Thunder Bay.
S. B. Smith Mine	Gold Park P.O. via Wawa	Gold Park.
Sol d'Or Gold Mines, Ltd.	140 Wellington St., Ottawa	Kenora Dist.
*South Dome Lake Mines, Ltd.	204 McKinnon Bldg., Toronto	South Porcupine.
*South McKenzie Island Mines	85 Richmond St. W., Toronto	Red Lake.
*Spooners Gold Mines Ltd.	67 Yonge St., Toronto	Beardmore.
*Split Lake Gold Mines, Ltd.	67 Yonge St., Toronto	Kenora Dist.
*South Shore Gold Syndicate	67 Yonge St., Toronto	Porcupine.
Stanley Gold Mines, Ltd.	1455 Peel St., Montreal, Que.	Wawa.
St. Anthony Gold Mines, Ltd.	159 Bay St., Toronto	Sturgeon Lake Area.
*States-Canadian Gold Mine, Ltd.	347 Bay St., Toronto	Dist. of Sudbury.
*Strathy Basin Mines Ltd.	712 Federal Bldg., Toronto	Strathy Basin.
Sturgeon River Gold Mines, Ltd.	320 Bay St., Toronto	Thunder Bay.
*Supreme Gold Mines, Ltd.	44 Victoria St., Toronto	Thunder Bay.
*Surprise Lake Explorations Syndicate, Ltd.	702 National Bldg., Toronto	Woman Lake Area.
Sylvanite Gold Mines, Ltd.	Box 670, Kirkland Lake	Temiskaming.
Tashota Goldfields, Ltd.	Tashota.	Thunder Bay.
Teck-Hughes Gold Mines, Ltd.	Kirkland Lake	Teck Tp.
*Tecomseh Gold Mines, Ltd.	Fort Erie	Kenora.
*Tellarum Gold Mines, Ltd.	New Liskeard	Long Lac.
Toburn Gold Mines, Ltd.	217 Bay St., Toronto	Kirkland Lake.
*Tombill Gold Mines, Ltd.	Empire	Kenwell.
*Toronto Harbor Mines, Ltd.	67 Yonge St., Toronto	Lightning River.
*Tyrant Mines, Ltd.	Box 670, Kirkland Lake	Temiskaming.
*Wascanna Mines, Ltd.	67 Yonge St., Toronto	Kowkash Mining Div.
Wendigo Gold Mines, Ltd.	1306 Star Bldg., Toronto	Kenora.
*Wilport Gold Mines, Ltd.	347 Bay St., Toronto	Beardmore.
*Wilson Red Lake Gold Mines, Ltd.	1116 Federal Bldg., Toronto	Dist. of Patricia.
*Winoga Patricia Gold Mines, Ltd.	330 Bay St., Toronto	Pickle Lake.
*Woman River Gold Mines	New Liskeard	Dist. of Patricia.
Wright-Hargreaves Mines, Ltd.	Fort Erie	Kirkland Lake.
MANITOBA—		
*Bailor Gold Mines, Ltd.	200 Bay St., Toronto, Ont.	The Pas Mining Div.
*Big Bend Gold Mines, Ltd.	Room 7, Board Bldg., Winnipeg	Rice Lake Dist.
*Bissett Gold Mines, Ltd.	941 Somerset Bldg., Winnipeg	(a)
*Callinan Flin Flon Mines, Ltd.	45 Richmond St. W., Toronto, Ont.	Flin Flon.
Central Manitoba Mines, Ltd.	308 Paris Bldg., Winnipeg	Wadhope.
*Consolidated Goldfields of Manitoba, Ltd.	Somerset Bldg., Winnipeg	Rice Lake Dist.
*Cryderman Gold Mines, Ltd.	203 Turbine Bldg., Winnipeg	Central Manitoba.
Diana Gold Mines, Ltd.	346 Main St., Winnipeg	Rice Lake Dist.
*Garry-God's Lake Mines, Ltd.	244 Bay St., Toronto, Ont.	God's Lake Dist.
God's Lake Gold Mines, Ltd.	395 Main St., Winnipeg	God's Lake Dist.
*Gold Island Mining Co., Ltd.	505 Union Trust Bldg., Winnipeg	Winnipeg Mining Div.
Gunnar Gold Mines, Ltd.	1703 Star Bldg., Toronto, Ont.	Beresford Lake.
*Gurney Gold Mines, Ltd.	919 Grain Exchange Bldg., Winnipeg	The Pas Mining Div.
*Hope Gold Mines, Ltd.	725 Grain Exchange Bldg., Winnipeg	Lac du Bonnet Mining Div.
*Jowsey Island Gold Mines, Ltd.	395 Main St., Winnipeg	Winnipeg Mining Div.
*Laguna Gold Mines, Ltd.	350 Bay St., Toronto 2, Ont.	Herb Lake.
Manitow Mines, Ltd.	307 Union Trust Bldg., Winnipeg	Central Manitoba.
*Mercon Gold Mining Syndicate	601 Avenue Bldg., Winnipeg	Beresford Lake.
*Oro Plata Mining Corp., Ltd.	1101 Federal Bldg., Toronto, Ont.	(a)
*Packsack Mines, Ltd.	306 Hamilton Bldg., Winnipeg	Rice Lake Dist.
*Pine Lake Gold Mines, Ltd.	445 Somerset Bldg., Winnipeg	Oxford Lake Dist.
San Antonio Gold Mines, Ltd.	237 Curry Bldg., Winnipeg	Rice Lake Dist.
*Scotia Gold Mines, Ltd.	290 Garry St., Winnipeg	Beresford Lake.

DIRECTORY OF FIRMS—Continued

Principal Operators (x) in the Canadian Auriferous Quartz Mining Industry—Continued

Name	Head office address	Location
SASKATCHEWAN—		
Athona Mines, Ltd.	1306 Star Bldg., Toronto, Ont.	Athabaska Lake.
*Consolidated Mining & Smelting Co. of Canada, Ltd.	Trail, B.C.	Athabaska Lake.
*Elin Flon Gold Mines, Ltd.	310 Avenue Block, Winnipeg, Man.	Douglas Lake.
*Greenlee Mines, Ltd.	1306 Star Bldg., Toronto, Ont.	Athabaska Lake.
BRITISH COLUMBIA—		
Amandy Mines	Grand Forks	Greenwood Mining Div.
Ashloo Gold Mining Syndicate	411 Bank of Nova Scotia Bldg., Vancouver	Ashloo River.
Bayonne Cons. Mines, Ltd.	1007 Royal Bank Bldg., Vancouver	Nelson.
Black Cook Mines, Ltd.	Nelson	Ymir.
*Braeberne Gold Mining Co., Ltd.	616 Stock Exchange Bldg., 475 Howe St., Vancouver	Bridge River Mining Div.
Bralorne Mines, Ltd.	555 Burrard St., Vancouver	Lillooet Mining Div.
*Bridge Island Golds, Ltd.	411 Bank of Nova Scotia Bldg., Vancouver	Tatlayoko Lake.
B.R. Mountain Golds, Ltd.	789 W. Pender St., Vancouver	Lillooet Mining Div.
*Bridge River Motherlode, Ltd.	910 Stock Exchange Bldg., Vancouver	Trout Lake Mining Div.
*British Gold Mining Syndicate	7 Arcade Building, Victoria	Siwash Creek.
Brown, L. R. (White Star Mine)	Cepecoco	Zabellos River.
*B.R.X. (1935) Cons. Mines, Ltd.	616 Stock Exchange Bldg., Vancouver	Bridge River.
*Buena Vista Mining Co., Ltd.	Trail	Stewart.
*Burns Mountain Gold Quartz Mines, Ltd.	410 Seymour St., Vancouver	Cariboo Mining Div.
*Canadian Exploration, Ltd.	702 Pacific Bldg., Vancouver	Osoyoos Mining Div.
*Canadian Rand Gold Mines, Ltd.	1404 Royal Bank Bldg., Vancouver	Lillooet Mining Div.
Cariboo Gold Quartz Mining Co., Ltd.	602 Bower Bldg., Vancouver	Cariboo Mining Div.
Casey & Morin	Stewart	Stewart.
*Cawley & Assoc.	Salmo	Nelson Mining Div.
*Chilco Exploration Co., Ltd.	918 Rogers Bldg., Vancouver	Clinton Mining Div.
*Consolidated Mining & Smelting Co. of Canada, Ltd.	Trail	Aiken Lake, Perr Creek, Portland Canal and Clinton Mining Div.
Clubine Comstock Gold Mines, Ltd.	Box 1091, Nelson	Salmo.
Danzig Mines, Inc.	310 Lloyd Bldg., Seattle, Wash., U.S.A.	Clayoquot Mining Div.
Dentonia Mines, Ltd.	814 Credit Foncier Bldg., Vancouver	Greenwood Mining Div.
*Dictator Gold Mines, Ltd.	475 Howe St., Vancouver	Greenwood Mining Div.
Dufferin Golds, Ltd.	725 Standard Bank Bldg., Vancouver	Nelson Mining Div.
*Durango Gold Mines, Ltd.	814 Credit Foncier Bldg., Vancouver	Nelson Mining Div.
*Edward Congdon & Polon's Taku Mining Co., Ltd.	807 Lonsdale Bldg., Duluth, Minn., U.S.A.	Atlin Mining Div.
Esperanza Mines, Ltd.	618 Broughton St., Victoria	Nass River Mining Div.
*Excelsior Prospecting Syndicate, Ltd.	Box 635, Victoria	Portland Canal
Fairview Amalgamated Gold Mines, Ltd.	902 Stock Exchange Bldg., Vancouver	Osoyoos Mining Div.
*Federal Gold Mines, Ltd.	919 Stock Exchange Bldg., Vancouver	Lillooet Mining Div.
Forshaw, R.	Greenwood	Greenwood Mining Div.
*Frost, A. C.	Henry Bldg., Seattle, Wash., U.S.A.	Nelson Mining Div.
*General Lee Mining Company	Box 788, Nelson	W. Kootenay Mining Div.
Gibson, W. F., & Sons	Ahousat	Clayoquot Mining Div.
*Gold Bank Mining Syndicate	Bay Ave., Trail	Nelson Mining Div.
*Gold Belt Mining Co., Ltd.	616 Stock Exchange Bldg., Vancouver	Nelson Mining Div.
*Gold Mountain Mines, Ltd.	703 Royal Trust Bldg., Vancouver	Hedley.
*Gold Cup Mining Co., Ltd.	165 Broadway, New York City, U.S.A.	Nelson Mining Div.
Golden Drip, Ltd.	Rossland	Kootenay Mining Div.
*Gold Leasers, Ltd.	902 Credit Foncier Bldg., Vancouver	Portland Canal.
Gormley Brothers	Nelson	Nelson Mining Div.
Greenbridge Gold Mines, Ltd.	475 Howe St., Vancouver	Greenwood Mining Div.
*Haidi Gold Mines, Ltd.	612 Standard Bank Bldg., Vancouver	Queen Charlotte Islands.
Hallet, Mrs. Ellen	Greenwood	Greenwood Mining Div.
Hardie Brothers	Trail	Trail Creek Mining Div.
*Havilah Gold Mines, Ltd.	308 Union Building, Victoria	Alberni Mining Div.
*Hedley Gold Hill Mining Co., Ltd.	837 West Hastings St., Vancouver	Similkameen Mining Div.
Hedley Mascot Gold Mines, Ltd.	110 Water St., Vancouver	Osoyoos Mining Div.
*Hedley Amalgamated Gold Mines, Ltd.	404 West Hastings St., Vancouver	Osoyoos Mining Div.
*Helena Gold Mines, Ltd.	550 Hastings St. W., Vancouver	Portland Canal Mining Div.
*Hidden Creek Gold Mine, Ltd.	1229 Standard Bank Bldg., Vancouver	Yale Mining Div.
Island Mountain Mines Co., Ltd.	Wells	Cariboo.
I. X. L. Lessors, Ltd.	Rossland	Trail Creek Mining Div.
Jardave Exploration Syndicate	829 West Pender St., Vancouver	Vernon Mining Div.
Jenny Long Mines, Ltd.	912 Hall Bldg., Vancouver	Nicola Mining Div.
Kalamalka Gold Mines, Ltd.	208 Pacific Bldg., Vancouver	Vernon Mining Div.
Kamloops Homestead Mines, Ltd.	820 West Pender St., Vancouver	Kamloops Mining Div.
Kelowna Exploration Co., Ltd.	Hedley	Osoyoos Mining Div.
*King Midas Mining Co., Ltd.	509 Vancouver Block, Vancouver	Clayoquot Mining Div.
Kootenay Belle Gold Mines, Ltd.	425 Howe St., Vancouver	Nelson Mining Div.
Kurtzhals Brothers	Largueiti Island	Largueiti Island.
*Lardeau Gold & Silver Mines, Ltd.	475 Howe St., Vancouver	Lardeau Mining Div.
Livingstone Mining Co., Inc.	Blewett	Kootenay Mining Div.
Loughborough Gold Mines, Ltd.	718 Granville St., Vancouver	Vancouver Mining Div.
*Martel Gold Mines, Ltd.	208 Standard Bank Bldg., Vancouver	Ashcroft Mining Div.
McArthur, W. E.	Greenwood	Greenwood Mining Div.
McDonald, J. W., lessee	Thurlow	Thurlow.
Meridian Mining Co., Ltd.	555 Howe St., Vancouver	Lardeau Mining Div.
Minto Gold Mines, Ltd.	744 Hastings St. W., Vancouver	Lillooet Mining Div.
*Molly Gibson Mines, Ltd.	412 Grain Exchange Bldg., Vancouver	Grand Forks Mining Div.
Mulholland, J. W.	Nelson	Bayonne Mining Div.

DIRECTORY OF FIRMS—Continued

Principal Operators (x) in Canadian Auriferous Quartz Mining Industry—Concluded

Name	Head office address	Location
BRITISH COLUMBIA—Concluded		
*National Gold Mines, Ltd.	502 Pacific Bldg., Vancouver.	Bridge River Area.
*Nicholson Creek Mining Corp.	300 Insurance Bldg., Seattle, Wash., U.S.A.	Omineca Mining Div.
Noble Five Mines, Ltd.	420 Baker St., Nelson.	Nelson Mining Div.
Northern Mining & Milling Corp.	Thurlow.	Nanaimo Mining Div.
Norway Mining Co.	Trail.	Rossland.
*Nootka Zeballos Gold Mines, Ltd.	601 Bank of Toronto Bldg., Victoria.	Clayoquot Mining Div.
Kootenay Ore Hill Gold Mines, Ltd.	850 Hastings St. W., Vancouver.	Nelson Mining Div.
O.K. Leasing Co.	Box 167, Rossland.	Rossland.
*Omineca Gold Quartz Mines, Ltd.	Vanderhoof.	Terrace.
Oscarson, Roger.	Frie.	Nelson, Mining Div.
Osoyoos Mines, Ltd.	Bank of Toronto Bldg., Calgary, Alberta.	Osoyoos Mining Div.
*Pacific Eastern Gold, Ltd.	744 W. Hastings St., Vancouver.	Lillooet Mining Div.
*Pacific Mines, Pet. & Dev. Co., Ltd.	744 W. Hastings St., Vancouver.	Ceepeece.
Pavich, J. & Co.	Nelson.	Nelson Mining Div.
*Pilot Gold Mines, Ltd.	410 Seymour St., Vancouver.	Lillooet Mining Div.
*Polaris-Taku Mining Co., Ltd.	807 Lonsdale Bldg., Duluth, Minn., U.S.A.	Atlin Mining Div.
Pioneer Gold Mines of B.C., Ltd.	605 Rogers Bldg., Vancouver.	Lillooet Mining Div.
*Reliance Gold Mines.	411 Pacific Bldg., Vancouver.	Bridge River Dist.
Relief Arlington Mines, Ltd.	Premier.	Frie.
Reno Gold Mines, Ltd.	216 Yorkshire Bldg., Vancouver.	Nelson Mining Div.
Reward Mining Co., Ltd.	475 Howe St., Vancouver.	Lillooet and Skeena Mining Div.
Riegel Mines, Ltd.	Grand Forks.	Grand Forks Mining Div.
Rolick Bros.	Nelson.	Nelson Mining Div.
Sheep Creek Gold Mines, Ltd.	616 Stock Exchange Bldg., Vancouver.	Nelson Mining Div.
Shoal Bay Gold Mining Syndicate.	850 Hastings St. W., Vancouver.	Shoal Bay.
Silbak Premier Mines, Ltd.	Royal Trust Bldg., Vancouver.	Portland Canal Mining Div.
Slocan Monitor Mines, Ltd.	Pox 554, Nelson.	Slocan Mining Div.
Skidegate Gold Mines, Ltd.	789 Pender St. W., Vancouver.	Queen Charlotte Islands.
Surf Inlet Consolidated Gold Mines, Ltd.	744 Hastings St. W., Vancouver.	Skeena Mining Div.
Taylor Windfall Gold Mining Co., Ltd.	789 Pender St. W., Vancouver.	Whitewater Mining Div.
*Thunderbird Mines, Ltd.	Bank of Commerce Bldg., Nelson.	Wendmere Mining Div.
The N. A. Timmins Corporation.	1010 Canada Cement Bldg., Montreal, Que.	Porcher Island.
*Trites Gold Mining Co., Ltd.	744 Hastings St. W., Vancouver.	Ymir.
*Tuscarora Gold Mines, Ltd.	470 Granville St., Vancouver.	Lillooet Mining Div.
*Unak Ventures, Ltd.	4 Besner Bldg., Prince Rupert.	Portland Canal Mining Div.
Vancouver Island Gold Mines, Ltd.	854 Dunsmuir St., Vancouver.	Alberni Mining Div.
Velvet Gold Mining Co.	8655 E. Marginal Way, Seattle, Wash., U.S.A.	Kootenay Mining Div.
Vidette Gold Mines, Ltd.	404 Pacific Bldg., Vancouver.	Savona.
*Waneta Gold Mines, Ltd.	518 Ward St., Nelson.	Nelson River Mining Div.
Wayside Consolidated Gold Mines, Ltd.	511 Stock Exchange Bldg., Vancouver.	Bridge River Mining Div.
Wesko Mines, Ltd.	Box 544, Nelson.	Nelson Mining Div.
Wilcox Mining Syndicate.	Ymir.	West Kootenay.
Windpass Gold Mining Co., Ltd.	608 Pacific Bldg., Vancouver.	Kamloops Mining Div.
Ymir Consolidated Gold Mines, Ltd.	716 Hall Bldg., Vancouver.	Ymir.
Ymir Yankee Girl Gold Mines, Ltd.	Ymir.	Nelson, Mining Div.
NORTHWEST TERRITORIES—		
Slave Lake Gold Mines, Ltd.	1306 Star Bldg., Toronto, Ont.	Great Slave Area.
Vicmac Syndicate, Ltd.	1006 Concourse Bldg., Toronto, Ont.	Yellowknife Dist.

(a) Information not available.

(b) In addition to the companies listed, there were numerous operators working under lease on the LeRoy, Centre Star and other mines.

* Active, but not producing.

(x) In addition to the operators listed, there were numerous active properties for which official returns were not received—Auriferous Quartz Mining Industry.

Operators in Canadian Copper-Gold-Silver Mining Industry

QUEBEC—		
*Aldermac Copper Corp., Ltd.	941 Dominion Square Bldg., Montreal, Que.	Beauchastel Tp.
Consolidated Copper & Sulphur Co.	Eustis.	Ascot Tp.
*Fleming Mines, Ltd.	215 Ouest St. Jacques, Montreal.	Touicourt Tp.
*Fleury Chibougamau Exploration Syndicate.	8 Sault au Matelot, Quebec City.	Roy Tp.
*La Compagnie Minière d'Amos, Ltd.	1410 Stanley St., Montreal.	Dalquier Tp.
Nordmet Mines, Ltd.	804 Royal Bank Bldg., Toronto, Ont.	Rouyn and Desmeloizes Tps.
Normetal Mining Corp., Ltd.	350 Bay St., Toronto, Ont.	Desmeloizes Tp.
*Obalski Mining Corp.	910 Aldred Bldg., Place d'Armes, Montreal.	Chibougamau Dist.
*O'Leary Malartic Mines, Ltd.	Box 120, Noranda.	N. W. Quebec.
*Opemiska Copper Mines, Ltd.	25 King St. W., Toronto, Ont.	Levy Tp.
*Powell Rouyn Gold Mines, Ltd.	617 Confederation Life Bldg., Toronto, 2, Ont.	Rouyn Tp.
*Quebec Viking Gold Mines, Ltd.	100 Adelaide St. W., Toronto, Ont.	Beauchastel Tp.
*Rouyn Reward Gold Mines, Ltd.	330 Bay St., Toronto, Ont.	Rouyn Tp.
*Robb-Montbray Mines, Ltd.	1001-85 Richmond St. W., Toronto, Ont.	Montbray Tp.
*Waite-Amulet Mines, Ltd.	805 Royal Bank Bldg., Toronto, Ont.	Dupras and Dufresnay Tps.
MANITOBA AND SASKATCHEWAN—		
Hudson Bay Mining & Smelting Co., Ltd.	404 Dundas St., Woodstock, Ont.	Flin Flon.
*Sherritt Gordon Mines, Ltd.	25 King St. W., Toronto, Ont.	Sherridon, Man.
BRITISH COLUMBIA (b)—		
Britannia Mining & Smelting Co., Ltd.	Britannia Beach.	Britannia Beach.
Granby Consolidated Mining, Smelting & Power Co., Ltd.	789 Pender St., Vancouver.	Allenby.

* Active but not producing.

DIRECTORY OF FIRMS—Continued

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Name	Head office address	Location
*Canadian Beryllium Mines & Alloys, Ltd....	901 Royal Bank Bldg., Toronto, Ont.....	Quadeville, Ont.

* Active but not producing.

Chrome Ore Mining Industry

QUEBEC—		
Asbestos Corporation, Ltd.....	Canada Cement Bldg., Montreal.....	Thetford Mines.
Product—Chromite.		
*Plante, P. & Bros.....	Ste. Angele de Merici.....	Arvantgish Tp.
Product—Chromite.		
*Quebec Asbestos & Chrome Co.....	31 West 95th St. New York, N.Y.....	St. Cyr.
Product—Chromite.		
ONTARIO—		
Chromium Mining & Smelting Corp., Ltd....	Bank of Commerce Bldg., Hamilton.....	Collins.
Product—Chromite and ferrochrome.		

(*) Active but not producing.

Manganese Mining Industry

NOVA SCOTIA—		
Atlantic Manganese Corp., Ltd. (*).....	Box 486, Halifax.....	New Ross.
Product—Manganese ore.		
NEW BRUNSWICK—		
Casey, Harry E.....	173 Weldon St., Moncton.....	Turtle Creek.
Product—Manganese ore.		
Harrison, E.....	Elgin.....	Gowland Mt.
Product—Manganese ore.		

* Active but not producing.

Molybdenite Mining Industry

QUEBEC—		
Bain, J. Estate*.....	c/o Toronto General Trusts Corp., Ottawa, Ontario.	Hull Co.
Product—Molybdenite.		
ONTARIO—		
The Phoenix Molybdenite Corp., Ltd.....	36 Toronto St., Toronto.....	Renfrew Co.
Product—Molybdenite.		
BRITISH COLUMBIA—		
Consolidated Mining & Smelting Company of Canada, Ltd.*.....	Trail.....	Clinton.

* Active but not producing.

Nickel-Copper Mining Industry

ONTARIO—		
Cuniptau Mines, Ltd.....	38 King St. W., Toronto.....	Strathy Tp.
Falconbridge Nickel Mines, Ltd.....	25 King St. W., Toronto.....	Falconbridge Tp.
International Nickel Company of Canada, Ltd.....	Copper Cliff.....	Copper Cliff, Coniston and Port Colborne.
BRITISH COLUMBIA—		
B.C. Nickel Mines, Ltd.....	808 Standard Bank Bldg., Vancouver.....	Choate.

Non-Ferrous Smelting and Refining Industry

Copper Smelting Companies

Noranda Mines, Ltd.....	2 King St. E., Toronto, Ont.....	Noranda, Que.
†International Nickel Co., of Canada, Ltd.....	67 Wall St., New York City, U.S.A.....	Copper Cliff, Coniston and Port Colborne, Ont.
†Falconbridge Nickel Mines, Ltd.....	25 King St. W., Toronto, Ont.....	Falconbridge, Ont.
Hudson Bay Mining & Smelting Co., Ltd.....	404 Dundas St., Woodstock, Ont.....	Flin Flon, Man.

† Smelt nickel-copper ores and produce platinum and other precious metals.

DIRECTORY OF FIRMS—Continued**Electrolytic Copper Refining Companies**

Name	Head office address	Location
Canadian Copper Refiners, Ltd. (c).....	2 King St. E., Toronto, Ont.....	Montreal East, Que.
Ontario Refining Co., Ltd. (c).....	Copper Cliff, Ont.....	Copper Cliff, Ont.

(c) Also produce refined gold, silver, tellurium and selenium.

Lead Smelting and Refining Company

Consolidated Mining and Smelting Company of Canada, Ltd. (*).....	215 St. James St. W., Montreal, Que.....	Trail, B.C.
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(*) Produce bismuth or bismuth-bearing bullion as by-products.

Electrolytic Zinc Refining Companies

Consolidated Mining and Smelting Company of Canada, Ltd. (*).....	215 St. James St. W., Montreal, Que.....	Trail, B.C.
Hudson Bay Mining and Smelting Co., Ltd. (*)	404 Dundas St., Woodstock, Ont.....	Flin Flon, Man.

(*) Also produce cadmium.

Smelter and Refiner of Cobalt-Silver-Arsenic Ores

Deloro Smelting and Refining Co., Ltd. (*)....	Deloro, Ont.....	Deloro, Ont.
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(*) Also produce bismuth-bearing bullion.

Refiner of Uranium-Radium Ores

Eldorado Gold Mines, Ltd.	Star Bldg., Toronto, Ont.	Port Hope, Ont.
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Producer of Primary Aluminium

Aluminum Company of Canada, Ltd.....	Canada Life Bldg., Toronto (2), Ont.	Arvida and Shawinigan Falls Que.
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Smelter of Chromium Ores

Chromium Mining and Smelting Corp.....	Bank of Commerce Bldg., Hamilton, Ont...	Sault Ste. Marie, Ont.
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Producers of Platinum Metals(*)

Cuniptau Mines Ltd.....	38 King St. W., Toronto.....	Strathy Tp., Ont.
International Nickel Co. of Canada, Ltd.....	Copper Cliff, Ont.....	Acton, England.
Falconbridge Nickel Mines, Ltd.....	25 King St. W., Toronto, Ont.....	Kristiansand, Norway.

(*) In addition to the companies listed, there are usually individual miners reporting the recovery of small quantities of alluvial platinum from streams in British Columbia.

Quicksilver Ore

Manitou Mining Co., Ltd. (*).....	919 Stock Exchange Bldg., Vancouver.....	Bridge River Dist., B.C.
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(*) Active but not producing.

DIRECTORY OF FIRMS—Continued

Silver-Cobalt Mining Industry†

Name	Head office address	Location
Chitty, F. L.	Box 47, Cobalt, Ont.	Coleman Tp.
Cobalt Properties, Ltd.	Box 929, Cobalt, Ont.	Coleman Tp.
Cobnor Silver Mines, Ltd.	276 St. James St. W., Montreal, Que.	North Cobalt.
Comet Leasing Co.	Box 274, Cobalt, Ont.	Kerr Lake.
Dean, J. C.	Box 616, Cobalt, Ont.	Coleman Tp.
Ferro-Bellorain Trust	629 Wellington St., Ottawa, Ont.	Silver Centre.
Hudson Bay Mines, Ltd.	New Liskeard, Ont.	Coleman Tp.
La Rose Rouyn Mines, Ltd.	112 Yonge St., Toronto, Ont.	Coleman Tp.
Martin, Geo.	Box 659, Cobalt, Ont.	Coleman Tp.
McFarlane, F. J., and Allan, R. E.	Haileybury, Ont.	Coleman Tp.
McCready & Presse	Box 130, Cobalt, Ont.	Lorrain Tp.
The Mining Corporation of Canada, Ltd.	602-350 Bay St., Toronto, Ont.	Cobalt.
Morgantheler, A. G.	2108 S. 2nd St., Philadelphia, Pa., U.S.A.	South Lorrain.
Morrison Mines, Ltd.	165 Sparks St., Ottawa, Ont.	Coleman 1 p.
Murphy, A., and Landry, A. P.	Cobalt, Ont.	Nichol Tp.
Nipissing Mining Co., Ltd.	1007 Excelsior Life Bldg., Toronto, Ont.	Coleman 1 p.
O'Brien, M. J., Ltd.	900 Victoria Bldg., Ottawa, Ont.	Cobalt.
Oliver and Cameron	Elk Lake, Ont.	Coleman Tp. and Miller Lake
Price, C. W.	Box 388, Cobalt, Ont.	Nickel Tp.
Rowe, A., and Stuckey, C.	Box 79, Cobalt, Ont.	Coleman Tp.
Russel, Presse & McCready Syndicate	Box 130, Cobalt, Ont.	South Lorrain.
Sandoe and Moyle	Box 362, Cobalt, Ont.	Bucke Tp.
Silverado Gowanda Mines Ltd.	347 Bay St., Toronto, Ont.	Coleman Tp.
Sirola, Donald E.	Box 169, Cobalt, Ont.	Gowanda.
Taylor, W. D.	Box 632, Cobalt, Ont.	Coleman 1 p.
Temiskaming Mining Co., Ltd.	15 King St. W., Toronto, Ont.	Coleman Tp.
Yorkshire Cobalt Mining Co.	Box 508, Cobalt, Ont.	Cobalt.
		Bucke Tp.

(†) All located in the province of Ontario.

Silver-Lead-Zinc Mining Industry

NOVA SCOTIA—		
British Metal Corp. (Canada) Ltd.	706 Dominion Square Bldg., Montreal, Que.	Sterling.
QUEBEC—		
*Christie Mining Syndicate Inc.	4219 West Hill Ave., Montreal	Gaspé Co.
Estate Pierre Tetreault.	70 Holyrood Ave., Outremont.	Montauban Les Mines.
Gulf Development Co., Ltd.	486 St. John St., Montreal.	Restigouche.
*Mega Mining Syndicate.	55 Scott St., Quebec	
*Shawinigan Mining and Smelting Co., Ltd.	Montauban Les Mines	Portneuf Co.
ONTARIO—		
*Lennox Mines, Ltd.	Napanee.	Lennox and Addington Co.
BRITISH COLUMBIA—		
Alleo Silver Mines, Ltd.	708 Yorkshire Bldg., Vancouver	Revelstoke Mining Div.
Banker Mine	Kaslo	Ainsworth.
*Base Metals Mining Corporation, Ltd.	602-350 Bay St., Toronto, Ont.	Field.
Beaverdell Wellington Syndicate.	Greenwood	Beaverdell.
Beaver Silver Mines, Ltd.	708 Yorkshire Bldg., Vancouver	Greenwood.
Bell Mine, Ltd.	Box 464, Penticton	Beaverdell.
Bryant and McLeod.	Canal Flats.	Canal Flats.
Campbell, C. J.	New Denver	Slocan Mining Div.
Cliff Mine	616 Stock Exchange Bldg., Vancouver.	Slocan Mining Div.
Consolidated Mining and Smelting Co., Ltd.	Trail	Kimberley.
Consolidated Queen Bess Mines, Ltd.	Alamo	Alamo.
Cunningham Mines, Ltd.	Alamo	Sandon.
Denver Mining Syndicate	Box 3, New Denver	Slocan Mining Div.
Doney, E., & Son	Box 17, Sandon	Slocan Mining Div.
Erickson, E. A.	Silverton	Slocan Mining Div.
*Falconer, T. W.	Alice Arm	Naas River Mining Div.
Galena Farm Consolidated Mines, Ltd.	616 Stock Exchange Bldg., Vancouver.	Slocan Mining Div.
Harris and Kelly.	Sandon.	Slocan Mining Div.
Henderson, Geo.	Slocan City	Slocan Mining Div.
Highland Bell, Ltd. (Highland Lass, Ltd.)	Box 464, Penticton	Beaverdell.
Invermay Annex Mining Co., Ltd.	518 Richards St., Vancouver	Near Hope.
Jackson Mines, Ltd.	616 Stock Exchange Bldg., Vancouver.	Slocan Mining Div.
*Jenny Long Mines, Ltd.	800 Hall Bldg., Vancouver	Stump Lake.
Johnson, Albert	Silverton	Slocan Mining Div.
Hicks, Wm.	Slocan City	Slocan Mining Div.
King, Thos.	Smithers.	Smithers.
Krao Mines, Ltd.	Kaslo	Ainsworth Mining Div.
MacKay & Nelson	Grand Forks.	Greenwood Mining Div.
Madden, Wm.	Box 515, Greenwood	Yale Mining Div.
McDonald, B. T.	Stewart	Portland Canal.
Michael Silver Lead Mines, Ltd.	Bay Ave., Trail	Nelson Mining Div.
Molly Hughes Mining Co.	New Denver	Slocan Mining Div.
Morning Star Mine	Slocan	Slocan City.
Nicola Mines and Metals, Ltd.	1015 Rogers Bldg., Vancouver.	Stump Lake.
Noble Five Mines, Ltd.	Nelson	Slocan Mining Div.
Nordman, J. L.	Beaverdell.	Greenwood Mining Div.
*Ottawa Silver Mining and Milling Co.	401 Sherwood Bldg., Spokane, Wash., U.S.A.	Slocan City Mining Div.

DIRECTORY OF FIRMS—Continued

Silver-Lead-Zinc Mining Industry—Concluded

Name	Head office address	Location
BRITISH COLUMBIA—Concluded		
Pendry, J. H.....	New Denver.....	Sandon Mining Div.
Sally Mines, Ltd.....	Box 220, Penticton.....	Beaverdell.
*Salmo-Malartic Mines, Ltd.....	608-159 Bay St., Toronto, Ont.....	Nelson Mining Div.
Sherdahl, C.....	Box 226, Rossland.....	Canyon Creek.
*Silver Ridge Mining Co., Ltd.....	Sandon.....	Slocan Mining Div.
United Empire Gold and Silver Mining Co., Ltd.....	510 West Hastings St., Vancouver.....	Stewart.
Wellbun Mining, Milling and Power Co., Ltd.....	Stewart.....	Stewart.
Western Exploration Co., Ltd.....	Silverton.....	Kaslo Mining Div.
Whitewater Mines, Ltd.....	Kaslo.....	Retallack.
YUKON TERRITORY—		
Brefalt and Tolmie.....	Mayo Landing.....	Mayo Dist.
Butyer and Meure.....	Keno Hill.....	Mayo Dist.
Colly and Morrison.....	Mayo Landing.....	Mayo Dist.
Gordon and Moreau.....	Keno Hill.....	Mayo Dist.
Treadwell Yukon Co., Ltd.....	Crocker Bldg., San Francisco, Cal., U.S.A.....	Mayo Dist.
NORTHWEST TERRITORIES—		
*Bear Exploration and Radium, Ltd.....	1112-85 Richmond St. W., Toronto, Ont.....	Great Bear Lake.
*Consolidated Mining and Smelting Co. of Canada, Ltd.....	Trail.....	Great Bear Lake.
El Bonanza Mining Corp., Ltd.....	80 King St. W., Toronto, Ont.....	Great Bear Lake.
Eldorado Gold Mines, Ltd.....	80 King St. W., Toronto, Ont.....	Great Bear Lake.
*Hottah Lake Gold and Radium Mines, Ltd.....	1116 Federal Bldg., Toronto, Ont.....	Beaverlodge Lake.

*Active but not producing.

NOTE.—Operators listed under the Northwest Territories are essentially producers of silver or silver-pitchblende ores. Based on the value of the gold content of their ores, some important silver-lead producers in British Columbia are classified as gold mines and as such are listed in the directory of the Canadian Gold Mining Industry.

Tellurium and Selenium (See copper refiners)

Titanium Ore Mining Companies

QUEBEC—		
Baie St. Paul Titanic Iron Ore Co.....	Baie St. Paul.....	St. Urbain.
*Canadian Pyrites, Ltd.....	c/o E. L. du Pont de Nemours & Co., Wilmington, Del., U.S.A.....	St. Urbain.

*Active but not producing.

Tungsten Mining Industry

NOVA SCOTIA—		
*Indian Path Mines, Ltd.....	711 Dennis Bldg., Halifax, N.S.....	Lunenburg Co., N.S.
Product—Tungsten Ore.		
BRITISH COLUMBIA—		
*Columbia Tungsten Co., Ltd.....	61 Broadway, New York, N.Y., U.S.A.....	Wells area—Dist. 2.

*Active but not producing.

NON-METAL MINING INDUSTRIES, INCLUDING FUELS

FUELS

DIRECTORY OF FIRMS—Continued

Coal Mining Industry

Name	Head office address	Location
NOVA SCOTIA—		
Acadia Coal Co., Ltd.	Stellarton	District
Bras d'Or Coal Co., Ltd.	Little Bras d'Or Bridge	Pictou
British Coal Co., Ltd.	Sydney	Cape Breton.
Cumberland Railway & Coal Co., Ltd.	Springhill	Cape Breton.
Dominion Coal Co., Ltd.	Sydney	Cumberland.
Greenwood Coal Co., Ltd.	New Glasgow	Cape Breton.
Indian Cove Coal Co., Ltd.	Sydney Mines	Pictou
Intercolonial Coal Co., Ltd.	Westville	Cape Breton.
Inverness Coal Mine	Inverness	Pictou
Maritime Coal, Railway & Power Co., Ltd.	Amherst	Inverness.
Nova Scotia Steel & Coal Co., Ltd.	Sydney	Cumberland.
Port Hood Coal Mines, Ltd.	Port Hood	Cape Breton.
Shore Coal Co., Ltd.	Amherst	Inverness.
Standard Coal Co., Ltd.	River Hebert	Cumberland.
Victoria Coal Co., Ltd.	New Glasgow	Cumberland.
NEW BRUNSWICK—		
Avon Coal Co., Ltd.	Saint John	County
Evans, W. B.	Minto	Queens.
Maritime Mining Syndicate	Chipman	Queens.
McDougal Bros.	Minto	Queens.
Minto Coal Co., Ltd.	Minto	Queens.
Miramichi Lumber Co., Ltd.	Minto	Queens.
Mitchell, Parker D.	West Saint John	Queens.
Myles, Geo. H. & Co.	Minto	Queens.
Newcastle Coal Co.	Minto	Queens.
Welton, Harvey	Minto	Queens.
Welton & Henderson, Ltd.	Minto	Queens.
SASKATCHEWAN—		
Banks, H.	Taylorlton	Municipality
Baniulis Bros.	Roche Percée	Near Pinto.
Bienfait Mines, Ltd.	Bienfait	Roche Percée.
Blue Flame Coal Mines, Ltd.	Leakville	Near Bienfait.
Crescent Collieries, Ltd.	Bienfait	Near Leakville.
Eastern Collieries of Bienfait, Ltd.	Estevan	Near Bienfait.
High Test Lignite Coal Co., Ltd.	Bienfait	Near Bienfait.
Jenish Bros.	Estevan	Near Estevan.
Lignite Coal Mines, Ltd.	Pinto	Near Taylorlton.
Manitoba and Saskatchewan Coal Co., Ltd.	503 Avenue Bldg., Winnipeg, Man.	Near Bienfait (Taylorlton).
Matheson and Uhrich	Taylorlton	Taylorlton.
Poage, H. E.	Roche Percée	Roche Percée.
Rock Springs Coal Co.	Taylorlton	Near Estevan.
Shand Coal & Brick Co.	Shand	Shand.
Truax Traer Coal Co., Ltd.	Estevan	Near Estevan.
Western Dominion Collieries, Ltd.	Taylorlton	Taylorlton.
Western Lignite Coal Mine	Bienfait	Near Bienfait.
ALBERTA—		
Bituminous—		
Brazeau Collieries, Ltd.	Nordegg	Nordegg.
Cadomin Coal Co., Ltd.	Cadomin (mine office), Edmonton (business office)	Mountain Park.
Canmore Coal Co., Ltd.	Canmore	Cascade.
Hillcrest Collieries, Ltd.	Hillcrest	Crowsnest.
International Coal & Coke Co., Ltd.	Coleman	Crowsnest.
Luscar Collieries, Ltd.	Edmonton	Mountain Park.
McGillivray Creek Coal & Coke Co., Ltd.	Coleman	Crowsnest.
Mohawk Bituminous Mines, Ltd.	Bellevue	Crowsnest.
Mountain Park Collieries, Ltd.	410 Tegler Bldg., Edmonton	Mountain Park.
West Canadian Collieries, Ltd.	Blairmore	Crowsnest.
Sub-bituminous—		
Alexo Coal Co., Ltd.	Alexo	Saunders.
Bighorn & Saunders Creek Collieries, Ltd.	Saunders	Saunders.
Bryan Coal Co., Ltd.	Edmonton	Coalspur.
Coal Valley Mining Co., Ltd.	Coal Valley	Coalspur.
Foothills Collieries, Ltd.	Foothills	Coalspur.
Hinton Collieries, Ltd.	Hinton	Prairie Creek.
Jasper Coal Co., Ltd.	Edmonton	Prairie Creek.
Lakeside Coal, Ltd.	Edmonton	Coalspur.
McLeod River Hard Coal Co., Ltd.	Mercoal	Coalspur.
Sterling Collieries, Ltd.	Edmonton	Coalspur.
Lignite—		
Aetna Coal Co., Ltd.	East Coulee	Drumheller.
Alberta Block Coal Co., Ltd.	Drumheller	Drumheller.
Atlas Coal Co., Ltd.	East Coulee	Drumheller.

DIRECTORY OF FIRMS—Continued

Coal Mining Industry—Concluded

Name	Head office address	Location
ALBERTA—Concluded		
Lignite—Concluded		
Balogh Coal Co., Ltd.	Carbon	Carbon
Beverley Coal Co., Ltd.	Edmonton	Edmonton
Brilliant Coal Co., Ltd.	Drumheller	Drumheller
Bush Mines, Ltd.	Edmonton	Edmonton
Cambrian Coal Co., Ltd.	Drumheller	Drumheller
Canadian Dinant Coal Co., Ltd.	Dinant	Camrose and Carbon
Chinook Coal Co., Ltd.	Sheerness	Sheerness
City of Lethbridge Coal Mines	Lethbridge	Lethbridge
Comet Coal Co., Ltd.	East Coulee	Drumheller
Commander Coal Co.	Drumheller	Drumheller
Dawson Coal Co., Ltd.	Edmonton	Edmonton
Edina Coal Co., Ltd.	Edmonton	Edmonton
Elgin Coal Co., Ltd.	Drumheller	Drumheller
Empire Collieries, Ltd.	East Coulee	Drumheller
Fraser-Mackay Collieries, Ltd.	10055-101st St., Edmonton	Edmonton
Fridel Red Hot Coal Co.	Forest Heights	Edmonton
Gibb, W. E.	Edmonton	Edmonton
Gotheridge, W. T. & Sons	Round Hill	Camrose
Great West Coal Co., Ltd.	Edmonton	Edmonton
Gunderson Brick & Coal Co., Ltd.	Redcliff	Redcliff
Hamilton, J. J., Coal Co.	Lethbridge	Lethbridge
Hudyma & Co.	South Edmonton	Edmonton
Hy-Grade Coal Co., Ltd.	Drumheller	Drumheller
Ideal Coal Co., Ltd.	Wayne	Drumheller
Jewel Collieries, Ltd.	Wayne	Drumheller
Keith & Fulton Coal Co.	Clover Bar	Edmonton
Kelstar Coals, Ltd.	Carbondale	Edmonton
Kent Coal Co., Ltd.	Edmonton	Edmonton
Kleenbinn Collieries, Ltd.	Eyremore	Brooks
Lakeside Coals, Ltd.	Edmonton	Pembina
Leavell Coal Co., Ltd.	Sheerness	Sheerness
Lethbridge Collieries, Ltd.	Lethbridge	Lethbridge
Lund, Nelson, Hagblad & Degaust	Lethbridge	Lethbridge
Maple Leaf Minerals, Ltd.	Drumheller	Drumheller
Marcus Coal Mines, Ltd.	Edmonton	Edmonton
McDonell Coal Co.	Namoo	Edmonton
Midland Coal Mining Co., Ltd.	Midlandvale	Drumheller
Monarch Coal Mining Co., Ltd.	Drumheller	Drumheller
Murray Collieries, Ltd.	East Coulee	Drumheller
Mutual Supplies, Ltd.	Wayne	Drumheller
Newcastle Coal Co., Ltd.	Drumheller	Drumheller
Northern Coal Co., Ltd.	Picture Butte	Lethbridge
Oliphant, John	Medicine Hat	Redcliff
Oliphant, J. H.	Carbon	Carbon
Ottewell Coal Co.	Clover Bar	Edmonton
Parker, L.	Cardiff	Edmonton
Peerless Carbon Collieries	Carbon	Carbon
Poholka, S.	South Edmonton	Edmonton
Red Deer Valley Coal Co., Ltd.	Drumheller	Drumheller
Red Flame Coal Co.	Round Hill	Camrose
Riverdale Coal Co.	Edmonton	Edmonton
Rock Springs Longwall Coal Co.	Calgary	Taber
Rollingson, J.	Lethbridge	Lethbridge
Rosedale Collieries, Ltd.	Aerial	Drumheller
Rosedale Collieries, Ltd.	Rosedale	Drumheller
Royal Lethbridge Collieries	Lethbridge	Lethbridge
Royalties Oil & Share Corp., Ltd.	Calgary	Pembina
Sinoski, M.	Strathcona	Edmonton
Stoney Creek Collieries, Ltd.	Camrose	Camrose
Super Heat Coal Co.	Ardley	Ardley
Superior Grade Coal Co., Ltd.	Wayne	Drumheller
Tofield Coal Co., Ltd.	Tofield	Tofield
Tredway Bros.	Dodds	Tofield
Western Gem Coal Co., Ltd.	Drumheller	Drumheller
BRITISH COLUMBIA—		
Bulkley Valley Colliery	Tolkwa	Inland
Canadian Collieries (Dunsmuir), Ltd.	Nanaimo	Inland
Coalmont Collieries, Ltd.	Coalmont	Inland
Crow's Nest Pass Coal Co., Ltd.	Fernie	Crow's Nest Pass
Lantzville Collieries, Ltd.	Lantzville	Inland
Middlesboro Collieries, Ltd.	Merritt	Inland
Pleasant Valley Mining Co., Ltd.	Princeton	Inland
Tulameen Collieries, Ltd.	Princeton	Inland
Western Fuel Corporation of Canada, Ltd.	Nanaimo	Inland
Wilson Mining & Investment Co., Ltd.	Vancouver	Inland

Natural Gas Industry

NEW BRUNSWICK—		
New Brunswick Gas & Oilfields, Ltd.	Moncton	Stony Creek.
(b) Moncton Electricity & Gas Co. Ltd.	Moncton	

DIRECTORY OF FIRMS—Continued

Natural Gas Industry—Continued

Name	Head office address	Location
ONTARIO—		
Acme Gas & Oil Co., Ltd.	Suite 1602, 330 Bay St., Toronto.	Middleton.
(e) Ajax Oil & Gas Co., Ltd.	159 Bay St., Toronto.	Dover, Middleton and Tuscarora.
(a) Allen, A. J.	Dunville.	
Aloka Oil Co., Ltd.	57 Queen St. W., Toronto.	Dereham and Onondaga.
Amity Gas Co.	Lowbanks.	Moulton.
Aragain Gold & Natural Gas Syndicate.	34 King St. E., Toronto.	Canboro.
Avery, Esmond & Company.	5172 St. Jean Ave., Detroit, Mich., U.S.A.	Cayuga North.
Barnhart, Mrs. E.	Stevensville.	Bertie.
(d) Bayham Gas & Oil Syndicate.	Canfield.	Bayham.
Beacon Natural Gas Syndicate.	189 King St. N., Waterloo.	Walpole.
Beer, Geo.	Binbrook.	Binbrook.
Benn, A. S.	Hagersville.	Walpole.
Bertie Gas Co.	Selkirk.	Bertie.
Binbrook Gas Co.	Binbrook.	Binbrook.
Blackheath Gas Co.	539 Penobscot Bldg., Detroit, Mich., U.S.A.	Seneca.
Broadway Gas Syndicate.	Jarvis.	Walpole.
(c) Brook, J. S.	Simcoe.	Woodhouse.
Buck, C. S.	Port Rowan.	Walsingham South.
Burchell Gas & Oil Syndicate.	1111 Canada Permanent Bldg., Toronto.	Canboro, Raleigh and Woodhouse.
Canada Cement Co., Ltd.	Port Colborne.	Wainfleet.
Canadian Natural Gas Syndicate.	Simcoe.	Bayham and Moulton.
Canby, B. F.	Wainfleet.	Wainfleet.
Canfield Gas Syndicate.	703 Capitol Park Bldg., Detroit, Mich., U.S.A.	Cayuga North.
Canfield Natural Gas Co., Ltd.	Canfield.	Cayuga North.
Cartwright, S. E.	1970 Penobscot Bldg., Detroit, Mich., U.S.A.	Walpole.
Central Pipe Line Co., Ltd.	Chatham.	Bayham, Houghton and Middleton.
Central Seneca Gas Syndicate.	Cayuga.	Seneca.
(b) City Gas Company of London.	215 Dundas St., London.	
Colbert, M. A.	Welland Junction.	Walpole.
Coleman, J. A.	Wellandport.	Gainsboro and Wainfleet.
Colonial Natural Gas and Oil Co.	Stoney Creek.	Canboro and Moulton.
Columbia Natural Gas & Oil Co., Ltd.	515 Pigott Bldg., Hamilton.	Dunn.
Comins, H. M.	Flint, Mich., U.S.A.	Rainham.
(c) Connor & McKeechie.	Dunnville.	Bayham.
Continental Gas Corp.	Goderich.	Binbrook and Walpole.
(c) (d) Croup, A. P. K.	17 Queen St. E., Toronto.	Cayuga North.
(e) Culver, W. H.	Dunnville.	Moulton and Oneida.
Dawson, Ralph.	Merlin.	Tilbury East.
(c) Dean Gas Syndicate.	Tillsonburg.	Middleton.
Delhi Gas Syndicate.	Fisherville.	Windham.
(d) Dexter Gas Co.	Brownsville.	Dereham.
Domestic Natural Gas Co., Ltd.	36 Toronto St., Toronto.	Seneca, Walpole, Moulton and Rainham.
Dominion Natural Gas Co., Ltd.	518 Jackson Bldg., Buffalo, N.Y., U.S.A.	Bayham, Binbrook, Caistor, Canboro, Cayuga (North and South), Charlotteville, Dunn, Glanford, Houghton, Humberstone, Malahide, Middleton, Moulton, Oneida, Onondaga, Rainham, Seneca, Sherbrooke, Townsend, Wainfleet, Walpole, Walsingham (North and South) and Woodhouse.
(d) Dufferin Natural Gas Syndicate.	Shelburne.	Cayuga South.
Dunnville Detroit Gas Syndicate.	703 Capitol Park Bldg., Detroit, Mich., U.S.A.	Cayuga North.
East Side Gas Co.	Lowbanks.	Sherbrooke.
(c) (d) Economy Natural Gas Syndicate.	Stratford.	Moulton, Walpole and Woodhouse.
(c) (d) Eden Natural Gas Co., Ltd.	Simcoe.	Bayham.
Emerald Gas Syndicate.	288 Bay St., Toronto.	Moulton and Oneida.
(e) Emerson, H. L.	Dunnville.	Canboro and Moulton.
Empire Natural Gas, Ltd.	25 King St. W., Toronto.	Walpole and Walsingham South.
Erie Gas Limited.	9 Toronto St., Toronto.	Woodhouse.
(a) Evans, H.	Brownsville.	
Firelite Gas & Oil Co., Ltd.	288 Bay St., Toronto.	Oneida, Rainham, Walpole and Walsingham South.
Fisherville Gas Co.	Fisherville.	Rainham.
Gas Finders & Producers Syndicate.	45 Richmond St. W., Toronto.	Cayuga North and Oneida.
Gas Producers Syndicate.	703 Capital Park Bldg., Detroit, Mich., U.S.A.	Raleigh.
Gifford, A., & Son.	Cayuga.	Cayuga South.
Glenny, D.	Dunnville.	Canboro.
(a) Goit, L. R.	Dunnville.	
Grand River Gas & Oil Syndicate.	Canfield.	Cayuga North.
Grand River Gas Co.	Cayuga.	Moulton.
(a) Gregory, Geo. F., & Son.	Petrolia.	
Grimsby Natural Gas Co., Ltd.	Grimsby.	Caistor and Gainsboro.

DIRECTORY OF FIRMS—Continued

Natural Gas Industry—Continued

Name	Head office address	Location
ONTARIO—Continued		
(c) (d) Gubb & Russell	Petrolia	Dawn.
Haldimand Gas Co.	Cayuga	Rainham.
Haldimand Gas Syndicate	Stevensville	Bertie.
Highbank Oil Limited	215 King St. W., Chatham	Raleigh.
(a) High Grade Natural Gas Co., Ltd.	215 King St. W., Chatham	
Hill, A. W.	Coatsworth	Tilbury East.
(a) Hoover, A. E.	Selkirk	
Hope Gas Syndicate	43 Ontario St., St. Catharines	Moulton.
(a) House, Charles C.	Stevensville	
House & Harris	Stevensville	Bertie.
(d) Hulse, J. W.	Buffalo, N.Y., U.S.A.	Bertie.
(a) Hussey, W. J.	Petrolia	
Ideal Gas Syndicate	Fisherville	Rainham.
(a) Jackson, Percy L.	Dunnville	
(c) Jasperson, Bon.	Kingsville	Gosfield South.
Kelly Gas & Oil Syndicate	15 Drayton Ave., Toronto	Rainham and Walpole.
Kindy, D., & Son.	Selkirk	Rainham.
(c) Kiser Bros.	90 Park St., Chatham	
Ladd & Kabana.	1957 Penobscot Bldg., Detroit, Mich., U.S.A.	Tilbury East.
Ladd & Knight	1957 Penobscot Bldg., Detroit, Mich., U.S.A.	Raleigh and Walpole.
Ladd-Knight-Medina Natural Gas Company	1957 Penobscot Bldg., Detroit, Mich., U.S.A.	Dover.
Ladd and Zeigen	1957 Penobscot Bldg., Detroit, Mich., U.S.A.	Tilbury East.
(a) Lauer, D. G.	Tillsonburg	
(c) Leamington, Town of	Leamington	
Lincoln Gas Co., Ltd.	10 Adelaide St. E., Toronto	Caistor, Canboro and Gainsboro.
Lindsay, William B., Estate of	Canada Permanent Bldg., Edmonton, Alta.	Canboro, Rainham and Walpole.
(d) Little & O'Brien	Dunnville	Cayuga North.
(c) Lymburner Bros. & Webber	Dunnville	Moulton, Rainham and Walpole.
Lynn Valley Gas & Oil, Ltd.	43 Albert St., Waterloo	Oneida.
Manchester, James	36-38 King St. E., Toronto	Rainham.
(b) Manufacturers Natural Gas	518 Jackson Bldg., Buffalo, N.Y., U.S.A.	
(d) Massey Oil & Gas Co.	Toronto	Dover.
May-Gold and Natural Gas Syndicate	45 Richmond St. W., Toronto	Canboro.
(a) McCutcheon, Thos. J.	Dunnville	
(a) McKechnie, S.	Dunnville	
McKechnie & Hussey	Dunnville	Canboro and Walpole.
(a) McKillop, Wm.	Hepworth	
(a) McLister, J. J.	Dunnville	
(d) McNevin, J.	Petrolia	Dereham.
Melrose Oil & Gas Syndicate	509 Kent Bldg., Toronto	Oneida.
Middleton-Norfolk Gas Co.	Chatham	Middleton.
Midfield Natural Gas Co.	811 Federal Bldg., Toronto	Cayuga North, Moulton and Oneida.
Midwal Oil & Gas Co., Ltd.	5 Elmer Ave., Toronto	Cayuga South, Middleton and Walsingham North.
Minnicog Gas Company	5172 St. Jean Ave., Detroit, Mich., U.S.A.	Cayuga North.
Mohawk Gas & Oil Syndicate, Ltd.	421 Main St. E., Hamilton	Canboro Oneida and Walpole
Monarch Gas & Oil Syndicate	Fisherville	Walpole.
National Gas Syndicate	Dunnville	Seneca.
Nelles Corners Gas Co.	Nelles Corners	Cayuga North and Rainham
Niagara Natural Gas Co., Ltd.	72 East Main St., Welland	Moulton.
Niece, H., & Son	Lowbanks	Sherbrooke.
Norhal Gas and Oil, Ltd.	10 McNab St. S., Hamilton	Walpole.
North Cayuga Gas Syndicate	1673 Beacon St., Brookline, Mass., U.S.A.	Cayuga North.
North Shore Gas Co.	Selkirk	Rainham.
Northern Gas & Gasoline Co.	Hepworth	Amabel.
Nottawa Oil & Gas Co., Ltd.	17 Queen St. E., Toronto	Amabel, Cayuga South, Keppel, Rainham, Wainfleet and Walpole.
(a) Ogletree, F. A.	Sarnia	
(b) Oil Springs Oil & Gas Co., Ltd.	Oil Springs	
(c) Oldrieve-Connor & McKechnie	St. Thomas	Dereham.
Olga Gas and Oil Co.	320 Bay St., Toronto	Bayham.
(b) Ontario Salt Co. (J. R. Robert)	1388 Erie St. E., Windsor	
Patterson, W. C.	Box 914, Jamestown, N.Y., U.S.A.	Cayuga North, Crowland, Dunn, Humberstone, Rainham, Walpole and Willoughby.
Perdue, J.	Chatham	Dawn and Malahide.
(a) Perkins, J. E.	Dunnville	
(c) (d) Petroleum Products	Chatham	
Petrol Oil & Gas Co., Ltd.	414 Bay St., Toronto	Dawn.
(e) Port Colborne-Welland Natural Gas & Oil Co., Ltd.	Port Colborne	Dover, Oneida, Onondaga and Tuscarora.
Prairie Gas & Oil Co., Ltd.	350 Bay St., Toronto 2	Oneida, Onondaga and Seneca.
Premier Oils Limited	539A St. Clair Ave. W., Toronto	Dover.
Provincial Gas Co., Ltd.	Fort Erie North	Onondaga.
Rainham Gas Syndicate	Cayuga	Bertie, Crowland, Humberstone and Willoughby.
Reicheld Gas Syndicate	Jarvis	Rainham and Seneca.
		Walpole.

DIRECTORY OF FIRMS—Continued

Natural Gas Industry—Continued

Name	Head office address	Location
ONTARIO—Concluded		
Rich Gas Co.	18 Lola Rd., Toronto	Moulton.
(e) Ricker, Arthur	Canboro.	Canboro.
Riley, J. V.	Simcoe.	Moulton.
River Valley Natural Gas Syndicate	112 Yonge St., Toronto	Oneida.
Rolston, Jas.	Dunnville.	Canboro.
Romney Gas & Oil Co.	18 Toronto St., Toronto	Romney, Tilbury East and Wainfleet.
Rose Valley Natural Gas Syndicate	275 De Savory Crescent, Toronto	Cayuga South and Middleton.
Rowe, E. P.	350 Bay St., Toronto	Bayham, Dover East, Middleton, Raleigh and Windham.
Salina Gas Co., Ltd.	47 Sixth St., Chatham	Tilbury East.
Sandusk Gas Syndicate	Fisherville.	Walpole.
Sarnia Gas & Oil Co.	107 King St. W., Kitchener	Enniskillen and Sarnia.
Security Gas Syndicate	Windsor	Binbrook, Glanford and Seneca.
Selected Natural Gas Syndicate	40 Garnock Ave., Toronto	Canboro, Moulton and Oneida.
(a) Semon and Kessler	Petrolia	
Shelton, S. F.	York.	Seneca.
Shepherd, E.	Dunnville.	Canboro.
Sherk, John M.	Ridgeway.	Canboro.
(c) (d) Smith, Armand	New Sarum	Bayham and Dereham.
(e) Smith and Ehde	Lowbanks.	Moulton.
Southern Ontario Gas Co., Ltd.	518 Jackson Bldg., Buffalo, N.Y., U.S.A.	Mersea, Raleigh, Romney and Tilbury East.
Springvale Gas & Oil Co., Ltd.	Hagersville.	Walpole.
Standard Gas & Oil Syndicate	Fisherville.	Rainham and Walpole.
Sterling Gas Co., Ltd.	7 Quebec St. W., Guelph	Walpole.
Stevensville Natural Gas & Fuel Co.	Stevensville.	Bertie.
(e) Stewart Bros.	Jarvis.	Walpole.
(e) Stover & Rawlings	Chatham	Dover.
Stromwell Syndicate	Tillsonburg.	Moulton.
(a) Stubble, H. H.	207 Pattison Ave., Chatham	
(a) Sundy, B. K.	Tillsonburg.	
Superior Gas Syndicate	Fisherville.	Rainham.
Sweets Corners Gas & Oil Syndicate	Fisherville.	Rainham.
Tanner, F. O.	General Motors Bldg., Detroit, Mich., U.S.A.	Cayuga North and Oneida.
Tillsonburg Oil & Gas Co., Ltd.	9 Richmond St. E., Toronto	Middleton.
(c) Treleven, A.	98 Central Ave., London	Dereham.
(c) (d) Turkey Point Club	Simcoe.	Charlottetown.
Union Gas Company of Canada, Ltd.	52 Fifth Ave., Chatham	Chatham, Dawn, Dover, Haldimand, Raleigh, Romney and Tilbury East.
Vacuum Gas & Oil Co., Ltd.	350 Bay St., Toronto	Middleton.
Victoria Gas Co.	Dunnville.	Rainham and Walpole.
(c) Walker and Drake	Bothwell.	Tilbury East.
Walpole Gas Syndicate	Cayuga.	Walpole.
(e) Walter Gas Syndicate, Ltd.	3020 Bailey Ave., Buffalo, N.Y., U.S.A.	Middleton, Townsend and Woodhouse.
(a) Wardell, J. L.	Cayuga.	
Welland County Gas Syndicate	Stevensville.	Bertie.
Western Ontario Natural Gas Co., Ltd.	Dunnville.	Canboro, Cayuga North, Dunn and Sherbrooke.
(a) Willits, Geo. & D. E.	Bothwell.	
(b) Windsor Gas Co., Ltd.	Windsor	
York Natural Gas Syndicate	18 Toronto St., Toronto	Oneida and Seneca.
MANITOBA—		
(a) Lisgar Oil & Gas Co., Ltd.	Box 7, La Rivière	Purves.
SASKATCHEWAN—		
Lloydminster Gas Co., Ltd.	Lloydminster	Lloydminster.
ALBERTA—		
Advance Oil Co., Ltd.	200 Leeson-Lineham Block, Calgary	Turner Valley.
Alberta Clay Products Co.	Medicine Hat	Medicine Hat.
Associated Oil & Gas Co., Ltd.	200 Leeson-Lineham Block, Calgary	Turner Valley.
Baltac Oils, Ltd.	200 Leeson-Lineham Block, Calgary	Turner Valley.
(b) Bow Island, Town of	Bow Island.	
Calgary Power Co., Ltd.	244 St. James St., Montreal, Que.	Bassano.
Canadian Maple Leaf Royalties, Ltd.	Calgary.	Highwood.
Canadian Pacific Railway Co.	Medicine Hat	Medicine Hat.
Canadian Western Natural Gas, Light, Heat & Power Co., Ltd.	215 Sixth Ave. W., Calgary	Brooks and Foremost.
Canadian Western Power & Fuel Co., Ltd.	Redcliff.	Redcliff.
Carleton Royalties, Ltd.	410 Lancaster Bldg., Calgary	Turner Valley.
Century Royalties, Ltd.	410-411 Lancaster Bldg., Calgary	Turner Valley.
Dalhousie Oil Co., Ltd.	606 Second St. W., Calgary	Turner Valley.
Dominion Glass Co., Ltd.	1111 Beaver Hall Hill, Montreal, Que.	Redcliff.
East Crest Oil Co., Ltd.	409 Maclean Block, Calgary	Turner Valley.
Foothills Oil & Gas Co., Ltd.	606 Second St. W., Calgary	Turner Valley.
Foundation Petroleum, Ltd.	902 Lancaster Bldg., Calgary	Turner Valley.
Gold Standard Oils, Ltd.	Wainwright	Wainwright.

DIRECTORY OF FIRMS—Continued

Natural Gas Industry—Concluded

Name	Head office address	Location
ALBERTA—Concluded		
Gunderson Brick & Coal Co., Ltd.	Redcliff	Redcliff.
Highwood-Sarcoe Oils, Ltd.	65 Canada Life Bldg., Calgary	Turner Valley.
Hudson's Bay Oil & Gas Co., Ltd.	c/o Continental Oil Co., Ponca City, Oklahoma, U.S.A.	Viking.
Hylo Oils, Ltd.	118 Renfrew Bldg., Calgary	Turner Valley.
Lowery Petroleum, Ltd.	68 King St. E., Toronto, Ont.	Turner Valley.
Maple Leaf Milling Co., Ltd.	Medicine Hat	Medicine Hat.
Maple Leaf Oil Co., Ltd.	1007 Stock Exchange Bldg., Vancouver, B.C.	Fabyan.
Medicine Hat Brick & Tile Co., Ltd.	Medicine Hat	Medicine Hat.
Medicine Hat, City of	Medicine Hat	Medicine Hat.
Mercury Oils, Ltd.	300 Lancaster Bldg., Calgary	Turner Valley.
Merland Oil Company of Canada, Ltd.	10 Clarence Block, Calgary	Turner Valley.
Miracle Oils, Ltd.	300 Lancaster Bldg., Calgary	Turner Valley.
Northwestern Utilities, Ltd.	10124-104th St., Edmonton	Viking.
Ogilvie Flour Mills Co., Ltd.	Medicine Hat	Medicine Hat.
Oil Investors, Ltd.	1005-Ninth Ave. E., Calgary	Turner Valley.
Range Oil & Gas Co., Ltd.	101 Canadian Bank of Commerce Bldg., Calgary	Border.
Redcliff Premier Brick Co., Ltd.	Redcliff	Redcliff.
Redcliff Pressed Brick Co.	Redcliff	Redcliff.
Renfrew Royalty Co., Ltd.	503 Lancaster Bldg., Calgary	Turner Valley.
Royalite Oil Co., Ltd.	608 Second St. W., Calgary	Turner Valley.
Southwest Petroleum Co., Ltd.	606 Second St. W., Calgary	Turner Valley.
Sterling Royalties, Ltd.	410 Lancaster Bldg., Calgary	Turner Valley.
Suffield, Village of	Suffield.	Suffield.
Terminal Oil Co., Ltd.	Box 186, Lethbridge	Del Bonita.
Turner Valley Royalties, Ltd.	905 Lancaster Bldg., Calgary	
Vanalta, Ltd.	Granville Island, Vancouver, B.C.	Red Coulee.
(b) Wainwright Gas Co., Ltd.	36 Dominion Bank Bldg., Edmonton	
Wetaskiwin, City of	Wetaskiwin.	Wetaskiwin.
NORTHWEST TERRITORIES—		
Northwest Co.	606 Second St. W., Calgary	Fort Norman.

- (a) Drilling only.
 (b) Distributing only.
 (c) Producing wells drilled in 1936—no output reported.
 (d) Dry wells drilled in 1936.
 (e) Drilling and producing.

Peat Industry

QUEBEC—		
Theriault & Malenfant, Inc.	St. Arsene	
ONTARIO—		
Countryman, G.	Chesterville	Winchester Tp.
Hills Green Peat Co.	Zurich, R.R. No. 1	Hay Tp.
Hodgkins, H. L. & Son	Wainfleet, R.R. No. 1	Wainfleet Tp.
Leasa, Wm.	Milverton	Ellice Tp.
Runkle, George & Sons	Kitchener	Waterloo Tp.
McIntosh, G. A.	Guelph	Near Galt.

Crude Petroleum Industry

NEW BRUNSWICK—		
New Brunswick Gas & Oilfields, Ltd.	Moncton	Stony Creek.
ONTARIO (*)—		
Aetna Oil Co., Ltd.	Windsor	Bothwell.
Armstrong, J. E., Estate of	26 Adelaide St. W., Toronto	Petrolia and Enniskillen.
Barnes, Henry	Oil Springs	Oil Springs.
Beattie, John	Glencoe	Mosa.
Bothwell Oil Trusteeship	Dougall St., Windsor	Bothwell.
Brock, Thos.	Petrolia	Petrolia and Enniskillen.
Brown, J.	Corunna	Moore.
Bryson, G. C.	Petrolia	Petrolia and Enniskillen.
Byers Bros.	Oil Springs	Oil Springs.
Byers, Mrs. Lydia	Oil Springs	Oil Springs.
Canadian Oil Refineries, Ltd.	12 Strachan Ave., Toronto	Petrolia and Enniskillen.
Carlton, W. G.	Petrolia	Petrolia and Enniskillen.
Colchester Oil & Gas Co.	Toronto	Thamesville.
(b) Cole, W. J.	Petrolia	Petrolia and Enniskillen.
Collins, Matthew	Petrolia	Petrolia and Enniskillen.
Crocker-Parks Oil Co., Ltd., The	Oil Springs	Oil Springs.
Delhi Gas Syndicate	Cayuga	Bothwell.
Dennis, Charles	Oil Springs	Oil Springs.
Dennis, Garnet	Oil Springs	Oil Springs.
Dennis, Welcome	Oil Springs	Oil Springs.
Dominion Petroleum Co., Ltd., The	Bank of Montreal Chambers, London	Mosa.

DIRECTORY OF FIRMS—Continued

Crude Petroleum Industry—Continued

Name	Head office address	Location
ONTARIO*—Concluded		
Donald, George	Oil Springs	Oil Springs.
Drake and Walker	Walkerville	East Tilbury.
Edward, F. H.	Petrolia	Petrolia and Enniskillen.
Egan, Charles	Petrolia	Petrolia and Enniskillen.
Fairbank, J. H., Estate of	Petrolia	Oil Springs.
Forsythe, A.	Copleston	Petrolia and Enniskillen.
Gillespie, Wm. O.	Petrolia	Petrolia and Enniskillen.
Goudie, Elroy	Petrolia	Petrolia and Enniskillen.
(b) Gregory, G. F.	Petrolia	Petrolia and Enniskillen.
Hamlin, F. G.	Petrolia	Petrolia and Enniskillen.
(a) Heal, A. A.	Petrolia	Petrolia and Enniskillen.
Hillis Bros.	Oil Springs	Oil Springs.
Holmes, E. B.	Bothwell	Bothwell.
Houston, Mrs. Annie	London	Petrolia and Enniskillen.
(b) Howlett, Fred W., & Sons, Ltd.	Petrolia	Petrolia and Enniskillen.
(a) Jackson, Percy L.	Dunnville	Petrolia and Enniskillen.
Kay, W. R.	Oil Springs	Oil Springs.
(b) Kells, E. E.	Petrolia	Petrolia and Enniskillen.
Kelly, J. E.	Petrolia	Petrolia and Enniskillen.
Kerr, John, Estate of	Petrolia	Petrolia and Enniskillen.
(a) Kiser Bros.	Chatham	Petrolia and Enniskillen.
Lather, Arthur	Bothwell	Bothwell.
Lather, D. C. & R.	Bothwell	Bothwell.
Lawton, H. B.	10040 Freeland Ave., Detroit, Mich., U.S.A.	Moore.
Levine, Harry	Petrolia	Petrolia and Enniskillen.
Lewis Bros.	Oil Springs	Oil Springs.
Lidster, Harold		Dunwich.
Loton, Percy	Bothwell	Bothwell.
McCort & Flett	Petrolia	Petrolia and Enniskillen.
McCrie, R. D.	Bothwell	Bothwell.
(a) McGaffey, R.	Bothwell	Bothwell.
McGill, J.	Bothwell	Bothwell.
McGillivray, G. A.	201 Mount Pleasant Ave., London	Oil Springs.
McIntosh, Frank R.	Petrolia	Petrolia and Enniskillen.
McMillan, D. C. and Warwick, J.	Bothwell	Bothwell.
(a) McNamara Construction Co.	Toronto	Bothwell.
Mitchell, Chas.	Oil Springs	Oil Springs.
Mitchell, D. J.	Glencoe	Mosa.
Mitchell, Robert	Oil Springs	Oil Springs.
Morningstar, H. M.	Oil Springs	Oil Springs.
Morningstar, L. H.	Oil Springs	Oil Springs.
Morris, George	Petrolia	Petrolia and Enniskillen.
Ontario Lands & Oil Co., Ltd., The	Petrolia	Petrolia and Enniskillen.
Parks, Blake	Petrolia	Petrolia and Enniskillen.
Patterson, F. L.	Petrolia	Moore.
Petrol Oil and Gas Co., Ltd.	414 Bay St., Toronto	Dover.
Prairie Gas and Oil Co., Ltd.	359 Bay St., Toronto	Dover.
Premier Oils, Limited	539a St. Clair Ave. W., Toronto	Onondaga.
Randle, Herbert	Bothwell	Bothwell.
Rawson, W. J.	Petrolia	Petrolia and Enniskillen.
Rowe, E. P.	404 Atlas Bldg., Toronto	Dover and Raleigh.
Shaw, Edwin	Mooretown	Moore.
Slack, Chas.	Petrolia	Petrolia and Enniskillen.
Sproule Bros.	Oil Springs	Oil Springs.
Sutherland, B. M.	Petrolia	Oil Springs.
Telsey Syndicate	Petrolia	Petrolia and Enniskillen.
Union Gas Co. of Canada, Ltd.	Gas Bldg., Fifth St., Chatham	Dawn.
(a) Von Berg, J.	8070 East Outer Drive, Detroit, Mich., U.S.A.	
Wallen & Wallen, Estate of	Oil Springs	Oil Springs.
Warwick, J.	Oil Springs	Oil Springs.
(b) Willits, D. E.	Bothwell	
(a) Windover, Wm.	Sarnia	
Winnett, J. W. G.	418½ Talbot St., London	Bothwell.
Woodward, Wm.	Oil Springs	Oil Springs.
Yerks, Carlton S.	Petrolia	Petrolia and Enniskillen.
Yerks, Frank	Petrolia	Petrolia and Enniskillen.

*Producers of 300 barrels or more during the year.

(a) Drillers only.

(b) Producers and drillers.

ALBERTA—

Advance Oil Co., Ltd.	200 Leeson-Lineham Block, Calgary	Turner Valley.
(c) Arca Development Co.	Box 28, Calgary	High River.
Associated Oil & Gas Co., Ltd.	200 Leeson-Lineham Block, Calgary	Turner Valley.
(c) Alberta Exploration Co., Ltd.	215 Sixth Ave. W., Calgary	Wainwright.
(c) B & B Royalties, Ltd.	905 Lancaster Bldg., Calgary	Turner Valley.
Baltao Oils, Ltd.	200 Leeson-Lineham Block, Calgary	Turner Valley.
Bethwain Oils, Ltd.	73 Adelaide St. W., Toronto, Ont.	Wainwright.
(d) British American Oil Co., Ltd.	1312 Royal Bank Bldg., Toronto, Ont.	
British Dominion Oil & Development Corp. Ltd.		
British Wainwright Oil & Development Co. Ltd.	205-208 Dominion Bank Bldg., Calgary	Turner Valley.
	703 Paris Building, Winnipeg, Man.	Wainwright.

DIRECTORY OF FIRMS—Continued

Crude Petroleum Industry—Concluded

Name	Head office address	Location
ALBERTA—Concluded		
(c) Canadian Maple Leaf Royalties, Ltd.....	1 Central Building, Calgary.....	Sinclair Highwood.
Carleton Royalties, Ltd.....	410 Lancaster Bldg., Calgary.....	Turner Valley.
Century Royalties, Ltd.....	410 Lancaster Bldg., Calgary.....	Turner Valley.
Dalhousie Oil Co., Ltd.....	606 Second St. W., Calgary.....	Turner Valley.
(c) Del Bonita Associated Oils, Ltd.....	Lethbridge.....	Twin River.
Director Royalties, Ltd.....	Royal Bank Bldg., Vancouver, B.C.....	Turner Valley.
East Crest Oil Co., Ltd.....	409 Maclean Block, Calgary.....	Turner Valley.
Edmonton Wainwright Oils, Ltd.....	Wainwright.....	Wainwright.
(c) Elbow Oil Co., Ltd.....	30 Michael Bldg., Calgary.....	Bragg Creek.
Foothills Oil & Gas Co., Ltd.....	606 Second St. W., Calgary.....	Turner Valley.
Foundation Petroleum, Ltd.....	902 Lancaster Bldg., Calgary.....	Turner Valley.
(c) Franco Oils, Ltd.....	Cardston.....	Cardston.
(d) Gas and Oil Products, Ltd.....	300 Lancaster Bldg., Calgary.....	
Hargal Oils, Limited.....	1007 Stock Exchange Bldg., Vancouver, B.C.....	Wainwright.
Highwood-Sarcee Oils, Ltd.....	65 Canada Life Bldg., Calgary.....	Turner Valley.
Homestead Oils, Ltd.....	303 Beveridge Bldg., Calgary.....	Turner Valley.
(c) Hunter Valley Oil Co., Ltd.....	508 Lougheed Bldg., Calgary.....	Hunter Valley.
Hylco Oils, Ltd.....	Renfrew Building, Calgary.....	Turner Valley.
Lowery Petroleum, Ltd.....	68 King St. E., Toronto, Ont.....	Turner Valley.
Mar-Jon Oil Co., Ltd.....	828 Rogers Bldg., Vancouver, B.C.....	Turner Valley.
(c) Maxmont Oil Co.....	Lundbreck.....	Watson.
(c) McDougall-McLeod Co.....	229 Eighth Ave. W., Calgary.....	Comrey.
McDougall-Segur Exploration Co. of Canada, Ltd.....	405 Eighth Ave., Calgary.....	Turner Valley.
McLeod Oil Co., Ltd.....	203 Grain Exchange Bldg., Calgary.....	Turner Valley.
Mercury Oils, Ltd.....	300 Lancaster Bldg., Calgary.....	Turner Valley.
Merland Oil Co. of Canada, Ltd.....	10 Clarence Block, Calgary.....	Turner Valley.
Mill City Petroleum, Ltd.....	300 Lancaster Bldg., Calgary.....	Turner Valley.
Miracle Oils, Ltd.....	300 Lancaster Bldg., Calgary.....	Turner Valley.
Model Oils, Ltd.....	7 Cameron Block, Calgary.....	Turner Valley.
(c) Montreal-Alberta Petroleum, Ltd.....	19 King St. E., Kitchener, Ont.....	Wainwright.
(c) Moose Oils, Ltd.....	714 Lancaster Bldg., Calgary.....	Moose Dome.
(c) Newfold Royalties, Ltd.....	905 Lancaster Bldg., Calgary.....	Turner Valley.
(c) New Valley Oil Co., Ltd.....	202 Grain Exchange Bldg., Calgary.....	New Valley.
Northwest Co., Ltd.....	606 Second St. W., Calgary.....	Turner Valley.
(c) Oil City Royalties, Ltd.....	101 Canadian Bank of Commerce Bldg., Calgary.....	Waterton Lakes.
Oil Investors, Ltd.....	1005 Ninth Ave. E., Calgary.....	Turner Valley.
Onalta Oil Co. (well).....	Wainwright.....	Wainwright.
Pacalta Operating Royalty Holders Committee.....	317 Alberta Corner, Calgary.....	Turner Valley.
(c) Paramount Oils, Ltd.....	407 Grain Exchange Bldg., Calgary.....	Turner Valley.
(c) Pekisko Hills Co., Ltd.....	4 Central Bldg., Calgary.....	Pekisko.
(c) Plains Petroleum Corp., Ltd.....	C.P.R. Building, Toronto, Ont.....	Taber.
Public Oil & Gas, Ltd.....	226 Examiner Building, Calgary.....	Turner Valley.
(c) Ranchmen's Gas and Oil Co., Ltd.....	Calgary.....	Ranchmen's.
(c) Rand Petroleum, Ltd.....	20 Central Building, Calgary.....	Turner Valley.
Renfrew Royalty Co., Ltd.....	503 Lancaster Building, Calgary.....	Turner Valley.
Richfield Petroleum, Ltd.....	503 Lancaster Building, Calgary.....	Turner Valley.
(c) Roxana Petroleum, Ltd.....	809 Lancaster Building, Calgary.....	Kootenay Dome.
(c) Royalite Oil Co., Ltd.....	606 Second St. W., Calgary.....	Turner Valley.
Sasko-Wainwright Oil & Gas, Ltd.....	108 Bowerman Bldg., Saskatoon, Sask.....	Wainwright.
Southwest Petroleum Co., Ltd.....	606 Second St. W., Calgary.....	Turner Valley.
Sovereign Royalties, Ltd.....	317 Alberta Corner, Calgary.....	Turner Valley.
Spooner Oils, Ltd.....	717-8 Lancaster Bldg., Calgary.....	Turner Valley.
Sterling Royalties, Ltd.....	410 Lancaster Bldg., Calgary.....	Turner Valley.
Structure Oil & Gas Co., Ltd.....	Calgary.....	Turner Valley.
(c) Sunshine Oils, Ltd.....	816 Hall Bldg., Vancouver, B.C.....	Del Bonita.
(c) Tenwell Gas & Oil Co.....	Vermilion.....	Vermilion.
Terminal Oil Co., Ltd.....	Box 186, Lethbridge.....	Del Bonita.
Turner Valley Royalties, Ltd.....	905 Lancaster Building, Calgary.....	Turner Valley.
Union Drilling Freehold Co.....	Lancaster Building, Calgary.....	Turner Valley.
Vanalta, Limited.....	Granville Island, Vancouver, B.C.....	Red Coulee.
Wainwright Petroleum, Ltd.....	10625-99th Avenue, Edmonton.....	Wainwright.
Wainwright Consolidated Oils, Ltd.....	Wainwright.....	Wainwright.
(c) Westside Royalties, Ltd.....	905 Lancaster Bldg., Calgary.....	Turner Valley.
Weymarn Petroleum, Ltd.....	500 Lancaster Bldg., Calgary.....	Pincher Creek.
Widney Oils, Ltd.....	229 Eighth Ave. W., Calgary.....	Turner Valley.
NORTHWEST TERRITORIES—		
Northwest Co., Ltd.....	606 Second St. W., Calgary.....	Fort Norman.

(c) Drilling only.

(d) Operates an absorption plant.

(e) In addition to operating wells in the Turner Valley field, this company operates two absorption plants.

OTHER NON-METAL MINING INDUSTRIES

DIRECTORY OF FIRMS—Continued

Asbestos Mining Industry

Name	Head office address	Location
QUEBEC—		
Asbestos Corporation, Ltd.	Canada Cement Bldg., Montreal.	Thetford Mines, Black Lake and Coleraine.
Bell Asbestos Mines, Ltd.	Thetford Mines.	Thetford Tp.
Canadian Johns-Manville Co., Ltd.	Sun Life Bldg., Montreal.	Asbestos.
Johnson's Company.	Thetford Mines.	Thetford Mines and Coleraine.
Keasbey and Mattison Co. (a).	Ambler, Pa., U.S.A.	Thetford Tp.
La Cie d'Amiante de Thetford, Ltd. (c).	Thetford Mines.	Adstock.
Nicolet Asbestos Mines, Ltd.	820 Transportation Bldg., Montreal.	Norbestos.
Northern Asbestos Co. Ltd. (b).	Thetford Mines.	Thetford Mines.
Quebec Asbestos Corp., Ltd.	East Broughton Station.	East Broughton Station.
ONTARIO—		
Rahn Lake Mines Corp., Ltd.	8½ Main St. W., North Bay.	Bannockburn Tp., Montrose Tp.

(a) Discontinued business in 1936—property now operated by Bell Asbestos Mines, Ltd.

(b) Discontinued business in November, 1936.

(c) Carried on exploration only.

Bituminous Sands

ALBERTA—		
*Absand Oils, Ltd.	703-350 Bay St., Toronto, Ont.	Northern Alberta.
*Bituminous Sand Extraction Co., Ltd.	507 MacLean Block, Calgary.	Northern Alberta.
*McMurray Asphaltum & Oil, Ltd.	Petrolia, Ont.	Northern Alberta.
International Bitumen Co., Ltd.	411 Williamson Bldg., Edmonton.	Northern Alberta.

*Active but no production.

Diatomite

NOVA SCOTIA—		
International Diatomite Industries, Ltd.	Halifax.	Little River, East New Annan.
ONTARIO—		
Canadian Multi-Cell, Ltd.	Harbour Commission Bldg., Toronto.	Martin's Siding.
Diatomite Refiners Co., Ltd.	Novar.	Novar.
Muskoka Diatomite, Ltd.	45 Richmond St. W., Toronto.	Gravenhurst.
Tynan, J., and Cox, E. R.	Novar.	Novar.
BRITISH COLUMBIA—		
MacInnes, W. H.	6757 Cypress St., Vancouver.	Cariboo Dist.

Feldspar and Quartz Mining Industry

NOVA SCOTIA—		
Dominion Steel & Coal Corp., Ltd. (a)	Sydney.	Leitches Creek.
QUEBEC—		
Cameron, Wm. and Donald.	Buckingham.	W. Portland Tp.
Canadian Carborundum Co., Ltd. (a) (b).	Box 65, Niagara Falls, Ont.	St. Canut.
Canadian Flint & Spar Co., Ltd. (b).	Box 340, Buckingham.	Buckingham.
Canadian Kaolin Silica Products, Ltd. (a) (b).	1007 Canada Cement Bldg., Montreal.	St. Remi d'Amherst.
Evans, W. H.	Box 63, Buckingham.	Buckingham Dist.
Lapointe, C. C. (a).	Notre Dame de la Salette.	W. Portland Tp.
Larocque, R. (a).	Buckingham.	Buckingham Dist.
Laviolette, A.	Notre Dame de la Salette.	E. Portland Tp.
Les Produits Silica Canadiens, Ltd. (a).	4074 Marlowe Ave., Montreal.	Roberval Co.
McDonnell, B. A.	Buckingham.	Derry Tp.
Montpetit Fils (a).	Melocheville.	Melocheville.
Ottawa Silica & Sandstone, Ltd. (a) (b).	Templeton.	Templeton.
Parcher, Alfred.	Glen Almond.	Derry Tp.
Pedneaud, G.	Glen Almond.	Buckingham Dist.
Perkins Mining Co.	Gatineau Pointe.	Derry Tp.
Soucy, Allen.	Buckingham.	Buckingham Dist.
St. Amour, Orphile.	Notre Dame de la Salette.	E. Portland Tp.
Stewart, Wm. (a).	Buckingham.	Buckingham Dist.
Wallingford, Arthur.	Gatineau Pointe.	Buckingham Dist.
Wallingford & Cornu.	Buckingham.	Buckingham Dist.
Warwick, Wm. (a).	Glen Almond.	Buckingham Dist.
Winning, Bush.	Notre Dame de la Salette.	Buckingham Dist.

DIRECTORY OF FIRMS—Continued

Feldspar and Quartz Mining Industry—Concluded

Name	Head office address	Location
ONTARIO—		
Barnes, Wm. R. (a).....	243 Cumberland Ave., Hamilton.....	Springvale.
Barr, W. J.	Westmeath.....	Eganville.
Bathurst Feldspar Mines, Ltd.....	508/21 King St. E., Toronto.....	Bathurst Tp.
Charette, S., & Son.....	Estaire.....	Burwash Tp.
Craig, T. H.	16 Victoria St., Perth.....	Lanark Co.
Dominion Mines & Quarries, Ltd. (a) (b)....	Canada Life Bldg., Toronto.....	Killarney.
Frontenac Floor & Wall Tile Co., Ltd. (b)....	Kingston.....	Kingston.
General Refractories, Ltd. (x) (a).....	706/100 Adelaide St. W., Toronto.....	Smoky Falls.
Gunters Mine.....	Prince's Lake.....	Sabine Tp.
Prince & Prince.....	Prince's Lake.....	Quadville.
Renfrew Minerals, Ltd.....	901 Royal Bank Bldg., Toronto.....	Mile 21 A.C.R.R.
Wright & Co. (a).....	960 Queen St., Sault Ste. Marie.....	
MANITOBA—		
Feldspar Products Co., Inc.....	Box 226, Warrood, Minn., U.S.A.....	Pointe du Bois.
BRITISH COLUMBIA—		
Consolidated Mining & Smelting Company of Canada, Ltd.....	Trail.....	Penticton.

(a) Reported shipments of silica only.

(b) Operates a mill.

(x) Active but not producing.

NOTE.—In addition to the firms listed, there are Canadian metallurgical companies producing low grade silica sand for their own use.

Fluorspar

ONTARIO—		
Stocklosar, Chas. A.....	Box 198, Madoc.....	Hastings Co.

Garnets

QUEBEC—		
*La Belle Mining, Inc.....	4203 Brebeuf St., Montreal.....	Joly Tp.

* Active but not producing.

Graphite

ONTARIO—		
Black Donald Graphite Co., Ltd.....	Calabogie.....	Brougham Tp.

Grindstones, Pulpstones and Sharpening Stones

NOVA SCOTIA—		
Read Stone Co., Ltd.....	Box 550, Sackville, N.B.....	Quarry Island (Pictou).
NEW BRUNSWICK—		
Read Stone Co., Ltd.....	Box 550, Sackville.....	Stonehaven.
Smith, E. A.	Shediac.....	Shediac.
BRITISH COLUMBIA—		
J. A. and C. H. McDonald, Ltd.....	1571 Main St., Vancouver.....	Gabriola and Haddington Islands and Vancouver.

Gypsum Mining Industry

NOVA SCOTIA—		
National Gypsum Co.....	192 Delaware Ave., Buffalo, N.Y., U.S.A.....	Aspy Bay, Cheticamp and Walton.
Canadian Gypsum Co., Ltd.....	1221 Bay St., Toronto, Ont.....	Wentworth.
The Connecticut Adamant Plaster Co.....	10 River St., New Haven, Conn., U.S.A.....	Cheverie.
*The Nova Scotia Coal & Gypsum Co., Ltd...	Box 13, Mabou.....	Mabou Harbour.
North American Gypsum Co.....	96 Curtis Ave., Rutland, Vt., U.S.A.....	Baddeck Bay.
*Windsor Gypsum Co.....	Box 727, Newburgh, N.Y., U.S.A.....	Newport Station.
Windsor Plaster Co., Ltd.....	Windsor.....	Brooklyn, Hants Co.
Victoria Gypsum Co., Ltd.....	Little Narrows.....	Little Narrows.
NEW BRUNSWICK—		
Canadian Gypsum Co., Ltd.....	1221 Bay St., Toronto, Ont.....	Hillsborough.

DIRECTORY OF FIRMS—Continued

Gypsum Mining Industry—Concluded

Name	Head office address	Location
ONTARIO— Canadian Gypsum Co., Ltd..... Gypsum, Lime and Alabastine, Canada, Ltd.	1221 Bay St., Toronto..... Paris.....	Hagersville. Caledonia.
MANITOBA— Gypsum, Lime and Alabastine, Canada, Ltd. Western Gypsum Products, Ltd.....	Paris, Ontario..... 503 McArthur Bldg., Winnipeg.....	Gypsumville. Amaranth.
BRITISH COLUMBIA— Gypsum, Lime and Alabastine, Canada, Ltd.	Paris, Ontario.....	Falkland.

* Active but not producing.

Iron Oxides Mining Industry

QUEBEC— Argall, Thos. H..... Girardin, Chas. D..... *McNicoll, Eugene..... Sherwin-Williams Company of Canada, Ltd.	639 St. Angel St., Three Rivers..... Yamachiche..... 354 St. Catherine St. E., Montreal..... 2875 Centre St., Montreal.....	Pointe du Lac. Almaville. Labelle Co. Red Mill.
BRITISH COLUMBIA— Davidson, J. G., and Thompson, J. H..... McDonald, R. W.....	3498 Marine Drive, Vancouver..... 128 Grizzly St., Banff, Alberta.....	Mons. Windermere Dist.

* Active but not producing.

Lithium Ore

MANITOBA— *The Lithium Corporation of Canada, Ltd.....	493 Avenue Bldg., Winnipeg.....	Bernie Lake.
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* Active but not producing.

Magnesitic Dolomite

QUEBEC— Canadian Refractories, Ltd..... International Magnesite Co., Ltd.....	1050 Canada Cement Bldg., Montreal..... Calumet.....	Grenville Tp. Harrington Tp.
BRITISH COLUMBIA— *Consolidated Mining & Smelting Company of Canada, Ltd.....	Trail.....	Marysville.

* No production reported in 1936.

Magnesium Sulphate

BRITISH COLUMBIA— Epsom Refineries, Ltd.....	395 Main St., Winnipeg, Man.....	Kamloops Dist.
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Mica Mining Industry

QUEBEC— Ahearn, W..... Bazin, M. F..... Blackburn Bros., Ltd. (a) (b)..... Boulanger, J. C..... Chenier, Z. E..... Clery, Geo..... Cross, W. C. (b)..... Eriksen, Erik J..... Martin, A. G. (b)..... McGarry, Ed..... McGlashan, Wm. M..... Morlot, Chas..... O'Brien & Fowler, Ltd..... Papineauville Lumber Co., Ltd..... Poirier, Adélard..... Simard, Eug..... Sparks, W. J. (b)..... *Radium Exploration Ltd..... Trudeau, W. (b)..... Wallingford, Ed. (b).....	538 MacLaren St., Ottawa, Ont..... 5778 Rue Cartier, Montreal..... 301 Blackburn Bldg., Ottawa, Ont..... 255 Grand Allee..... Box 12, Rockland, Ont..... Wilson's Corners..... Bridge St., Hull..... Alcove..... 236 Besserer St., Ottawa, Ont..... Wakefield..... Wilson's Corners..... Low..... Victoria Bldg., Ottawa, Ont..... Papineauville..... Wilson's Corners..... Bon Desir..... 343 Bell St., Ottawa, Ont..... 278 rue Saint-Paul, Quebec..... Old Chelsea..... Perkins.....	Hull Co. Joliette Co. Templeton Tp. Grenville. Wakefield (E.) Tp. Hull. Wakefield Tp. Wilson's Corners, Ottawa. Wakefield Tp. Wakefield Tp. Low. Hull Dist. Wilson's Corners. Saguenay Co. Iac Ste. Marie. Charlevoix Co. Hull Dist. Perkins.
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DIRECTORY OF FIRMS—Continued

Mica Mining Industry—Concluded

Name	Head office address	Location
ONTARIO—		
Bennett, H. V.....	Perth.....	Perth Dist.
Haughian, Frank.....	Perth.....	Perth Dist.
Kent Bros. (b).....	Gore St., Kingston.....	Kingston.
Lee, W. W.....	Bedford Mills.....	Buck and Bobs Lakes.
Loughborough Mining Co., Ltd. (b).....	Sydenham.....	Sydenham.
Thirty Island Lake Mica Co. (b).....	Verona.....	Frontenac and Lanark Co's.
White, J. A.....	Stanleyville.....	Stanleyville.

*Active but not producing.

(a) Operates a grinding plant.

(b) Operates a dressing works.

Mineral Waters (Natural)

QUEBEC—		
Abenakis Springs Co.....	Blondin.....	Quebec.
Eau Minérale Etoile.....	Ste. Genevieve de Batiscan.....	Quebec.
Gurd, Chas., & Co., Ltd.....	1016 Bleury St., Montreal.....	Quebec.
Laboratoire Mont-Clair.....	935 Robillard Ave., Montreal.....	Quebec.
Lacerte Adélaïde-Madame.....	St. Severe.....	Quebec.
Lamarre dit Bellemare, Josaphat.....	St. Barnabé Nord.....	Quebec.
La Cie d'Eau Minérale.....	148 Concorde St., St. Hyacinthe.....	Quebec.
La Cie Embouteillage Idéal.....	3 St. Germain St., St. Hyacinthe.....	Quebec.
L'Eau Naturelle Purgative de Chambord.....	Desbiens.....	Quebec.
Maski Bottling Works.....	Maskinonge.....	Quebec.
Pellerin, Albert.....	St. Barnabé Nord.....	Quebec.
Radnor Mineral Water Springs.....	St. Maurice.....	Quebec.
Richard, Gerard.....	St. Gregoire.....	Quebec.
Source Coulombia.....	L'Epiphanie.....	Quebec.
Vandal, Donat.....	64 rue St. Pierre, St. Hyacinthe.....	Quebec.
ONTARIO—		
Boyd, T. Russell.....	Carlsbad Springs.....	Ontario.
*Deneault, F.....	Bourget.....	Ontario.
Gurd, Chas., & Co., Ltd.....	1016 Bleury St., Montreal.....	Ontario.

Producers of Nepheline-Syenite

Canadian Nepheline, Ltd.....	712 Canada Permanent Bldg., Toronto, Ont..	Lakefield, Ont.
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Phosphate

QUEBEC—		
Bigelow, V.....	Glen Almond.....	Quebec.
Boisvenue, A.....	Notre Dame de la Salette.....	Quebec.
Cameron, B. & D.....	Buckingham.....	Quebec.
Miller, Jas.....	Glen Almond.....	Quebec.
Wallingford Bros.....	Perkins.....	Quebec.

Pyrites (Sulphur)

QUEBEC—		
*Aldermac Mines, Ltd. (b).....	941 Dominion Square Bldg., Montreal.....	Boischatel Tp.
*Consolidated Copper & Sulphur Co., Ltd.....	Eustis.....	Ascot Tp.
ONTARIO—		
International Nickel Co. of Canada, Ltd. (a).....	Copper Cliff.....	Copper Cliff.
BRITISH COLUMBIA—		
Consolidated Mining & Smelting Company of Canada, Ltd. (a).....	Trail.....	Trail.
*Britannia Mining & Smelting Co., Ltd.....	Britannia Beach.....	Britannia Beach.

*Concentrated from copper ore.

(a) Salvaged smelter gas.

(b) Active but no shipments.

Salt Industry

NOVA SCOTIA—		
Malagash Salt Co., Ltd.....	204 Provost St., New Glasgow.....	Malagash.

DIRECTORY OF FIRMS—Continued

Salt Industry—Concluded

Name	Head office address	Location
ONTARIO—		
Brunner, Mond Canada, Ltd.	Canadian Bank of Commerce Bldg., Toronto	Amherstburg.
Canadian Industries, Ltd.	P.O. Box 10, Montreal, P.Q.	Windsor.
The Dominion Salt Co., Ltd.	Sarnia.	Sarnia.
Goderich Salt Co., Ltd.	Goderich.	Goderich.
The Walker Salt Corp., Ltd.	Port Franks.	Port Franks.
Warwick Pure Salt Co., Ltd.	R.R. 5, Watford.	Lambton Co.
Western Canada Flour Mills Co., Ltd.	287 MacPherson Ave., Toronto.	Goderich.
MANITOBA—		
Neepawa Salt, Ltd.	P.O. Box 10, Montreal, Que.	Neepawa.
SASKATCHEWAN—		
*Simpson Oil Co. Ltd.	Simpson.	Simpson.
ALBERTA—		
Industrial Minerals, Ltd. (a)	Bank of Hamilton Bldg., Edmonton.	Waterways.

(a) Active but not producing.

*Idle in 1936.

Silica Brick

NOVA SCOTIA—		
Dominion Steel & Coal Corp., Ltd.	Sydney.	Sydney.
ONTARIO—		
Algoma Steel Corp., Ltd.	Sault Ste. Marie.	Sault Ste. Marie.

Sodium Carbonate

BRITISH COLUMBIA—		
B.C. Sodium Syndicate.	Kamloops.	Cherry Creek.
Bishop, James A.	Clinton.	Clinton.

Sodium Sulphate

SASKATCHEWAN—		
Dominion Sodium Refineries, Ltd.	513 Lougheed Bldg., Calgary, Alta.	Fusilier.
Horseshoe Lake Mining Co., Ltd.	Ormiston.	Ormiston.
Midwest Chemicals, Ltd.	Palo.	Palo.
Muskiki Sulphates, Ltd. (a)	Chinook, Alta.	Muskiki Lake.
Natural Sodium Products, Ltd.	Expanse.	Frederick Lake.
Oban Salt Co., Ltd. (a)	Oban.	Oban.
Saskasul, Ltd.	513 Westman Chambers, Regina.	Watrous.
Sodium Corporation, Ltd.	Alsask.	Alsask.
Sodium Sulphate Development Co. (a)	Viscount.	Viscount.

(a) Active but not producing.

Talc and Soapstone Industry

QUEBEC—		
Broughton Soapstone and Quarry Co., Ltd.	Broughton Station.	Broughton Tp.
Fortin, Charles.	Robertsonville.	Thetford Tp.
Pharo, L. C.	Thetford Mines.	Thetford Tp.
ONTARIO—		
Canada Talc, Ltd.	Madoc.	Hastings Co.
Gillespie, Geo. H., & Co., Ltd.	Box 232, Madoc.	Madoc.
Henderson Mines, Ltd.	Madoc.	Hastings Co.
BRITISH COLUMBIA—		
*Fairey and Cuncliffe.	660 Taylor St., Vancouver.	Anderson Lake.
*Kennedy, J. J.	Sooke Lake.	Sooke Lake.
Richmond, Geo. W.	2635 W. 15th Ave., Vancouver.	Anderson Lake.

*No operations reported in 1936.

CLAY PRODUCTS AND OTHER STRUCTURAL MATERIALS

CLAY PRODUCTS INDUSTRY

DIRECTORY OF FIRMS—Continued

Brick, Tile, Clay and Sewer Pipe (from domestic clay)

Name	Head office address	Location of plant
NOVA SCOTIA—		
Brooks, Stephen & Sons (a).....	Box 359, New Glasgow.....	New Glasgow.
MacIntyre, A. D. (a).....	11 Sheriff Ave., Sydney.....	Sydney.
Miller, James B.....	Elmsdale.....	Lantz Siding.
Shaw, L. E., Ltd.....	137 Lower Water St., Halifax.....	Lantz Siding.
Standard Clay Products, Ltd.....	St. Johns, Que.....	New Glasgow.
NEW BRUNSWICK—		
Little River Brick Co., Ltd.....	Little River, Saint John.....	Little River.
Ryan, M., & Son, Ltd.....	Fredericton.....	Fredericton.
Shaw, L. E., Ltd.....	137 Lower Water St., Halifax, N.S.....	Chipman.
Vandream, Adeland.....	Bathurst.....	Bathurst.
QUEBEC—		
Ascot Tile & Brick Co., Ltd.....	Ascot Corner.....	Richmond Co.
Begin, Olivier.....	R. R., Petite Riviere.....	Petite Riviere.
Bourbeau, Geo., & Fils.....	R. R. 1, Danville.....	Kingsey Falls.
Canadian Kaolin Silica Products, Ltd.....	660 St. Catherine St. W., Montreal.....	St. Remi d'Amherst.
Champlain Brick, Ltd.....	56 rue Laliberté, Quebec.....	Beauport-Est.
Chicoutimi Brick Co., Ltd.....	Chicoutimi.....	Chicoutimi.
Citadel Brick, Ltd.....	14 St. Joseph St., Quebec.....	L'Islet Station, Boischatel.
Côté, Albert.....	Victoriaville.....	Victoriaville.
Desmarais, S. E., & Co.....	Richmond.....	Richmond.
Duquette, Isidore.....	Box 626, East Angus.....	Compton Co.
Gaulin, E.....	Princeville.....	Princeville.
Hodgins, David T.....	Box 114, Shawville.....	Clarendon Tp.
Lafontaine, Onesime.....	St. Tite.....	St. Tite.
LaPrairie Co., Inc.....	660 Ste. Catherine St. W., Montreal.....	LaPrairie Co.
Montreal Terra-Cotta, Ltd.....	1010 Ste. Catherine St. W., Montreal.....	Lakeside.
Panet Brick Co., Ltd.....	L'Islet Station.....	L'Islet Station.
Parrot, Michel H.....	Deschailions.....	Deschailions.
Potvin, Alphonse.....	Deschailions.....	Deschailions.
Scott Brick Co.....	Scott Junction.....	Dorchester Co.
Standard Clay Products, Ltd.....	Box 189, St. Johns.....	St. Johns.
St. Lawrence Brick Co., Ltd.....	1010 St. Catherine St. W., Montreal.....	Laprairie.
ONTARIO—		
Barnes, Wm. R.....	243 Cumberland Ave., Hamilton.....	Various.
Belle River Brick & Tile Co.....	Belle River.....	Essex Co.
Brampton Pressed Brick Co., Ltd.....	Brampton.....	Peel Co.
Broadwell, B., & Son.....	Kingsville.....	Essex Co.
Campbell, N. F.....	R. R. 1, West Lorne.....	Aldborough Tp.
Canadian Pressed Brick Co., Ltd.....	Kenilworth Ave. S., Hamilton.....	Hamilton.
Casemore, R., & Son.....	Shallow Lake.....	Shallow Lake.
Chapman Bros.....	145 Dawes Rd., Toronto.....	East York Tp.
Construction Materials, Ltd.....	New Toronto.....	Etobicoke Tp.
Cooksville Co., Ltd.....	46 Bloor St. W., Toronto.....	Cooksville.
Coultis, Geo., & Son.....	Thedford.....	Lambton Co.
Cowell, Geo. W.....	Box 361, Tillsonburg.....	Oxford Co.
Curtin, F.....	R. R. 4, Lindsay.....	Victoria Co.
Curtis Bros.....	Box 809, Peterborough.....	Otonabee Tp.
Deller, A., & Sons.....	Brownsville.....	Oxford Co.
Deller Bros.....	R. R. 2, Norwich.....	Oxford Co.
Deller, Wm. H.....	Thorndale.....	W. Nissouri Tp.
Dochard Brick, Tile & Terra-Cotta Works.....	Arnprior.....	Arnprior.
Donaldson, Thos. Geo.....	R. R. 1, Greenock.....	Culross Tp.
Douglas & Douglas.....	Wilkesport.....	Lambton Co.
Dover Brick and Tile Works.....	Chatham.....	Dover Tp.
Elliott, Chas.....	Bluevale.....	Huron Co.
Elliott, Jas., Jr.....	Sault Ste. Marie.....	Korah Tp.
Elliott, Wm.....	Glenannan.....	Bruce Co.
Fletcher Brick and Tile.....	Fletcher.....	Kent Co.
Fort William Brick Co.....	Fort William.....	Fort William.
Frid Bros, Ltd.....	Main West and Macklem Sts., Hamilton.....	Hamilton.
Godfrey, Thos., & Co.....	Carleton Place.....	Lanark Co.
Gomall Brick & Tile Works.....	Powassan.....	S. Himsworth Tp.
Grimsby Brick & Tile Co.....	Grimsby.....	Grimsby.
Hamilton Pressed Brick Co., Ltd.....	209 Kensington Ave. S., Hamilton.....	Wentworth Co.
Harper Brick Works.....	348 Greenwood Ave., Toronto.....	Toronto.
Hill, Aaron.....	Essex.....	Essex.
Hill, Albert W.....	R. R. 1, Coatsworth.....	Tilbury East Tp.
Hitch, D. A.....	Box 236, Bridgetown.....	Howard Tp.
Hitch, Thos.....	St. Thomas.....	St. Thomas.
Hodder, Mrs. J. H., & Sons.....	Dutton.....	Elgin Co.
Howlett, Fred W., & Sons, Ltd.....	Box 3, Petrolia.....	Petrolia, Bridgen.
Huntsville Brick Works.....	Box 308, Huntsville.....	Muskoka.
Interprovincial Brick Co., Ltd.....	46 Bloor St. W., Toronto.....	Chiniquaoucy and Nassa-gaweya Tps.

DIRECTORY OF FIRMS—Continued

Brick, Tile, Clay and Sewer Pipe (from domestic clay)—Concluded

Name	Head office address	Location of plant
ONTARIO—Concluded		
Jackson, W. B., Brick & Tile.....	Brantford.....	Brantford.
Jamieson Lime Co.....	Renfrew.....	Renfrew.
James, D. A.....	Mount Brydges.....	Middlesex Co.
Jervis, W. J.....	R. R. 3, Dorchester.....	North Dorchester.
Jasperson Brick & Tile Co.....	Kingsville.....	Coatsworth.
Johnson, Jas., Estate of.....	Pembroke.....	Stafford Tp.
Koebel Bros.....	Box 3, St. Clements.....	St. Clements.
Lindsay, Earl & Sons.....	R. R. 2, Wallaceburg.....	Kent Co.
McComb, Chester.....	R. R. 2, London.....	Middlesex Co.
McCormick, Thos. L.....	R. R. 5, Watford.....	Lambton Co.
McFarlane, W. J.....	Forest.....	Fest.
Milton Brick, Ltd.....	1158 Bay St., Toronto.....	Milton.
Moulton, J.....	R. R. 2, Holyrood.....	Greenock Tp.
Napanee Brick & Tile Works.....	R. R. 3, Napanee.....	Lennox Co.
New Liskeard Brick Works.....	Box 74, New Liskeard.....	New Liskeard.
National Fireproofing Company of Canada, Ltd.....	96 Bloor St. W., Toronto.....	Wentworth Co.
National Sewer Pipe Co., Ltd.....	Aldershot.....	E. Flamboro Tp., Hamilton and Swansea.
Ontario Brick and Tile Plant (Government).....	Parliament Buildings, Toronto.....	Mimico.
O'Reilly, T. E.....	320 Bay St., Ottawa.....	Carleton Co.
Ottawa Brick & Terra-Cotta Co., Ltd.....	Billings Bridge.....	Carleton Co.
Ott Brick & Tile Mfg. Co., Ltd.....	Kitchener.....	Kitchener.
Owen Sound Brick Co., Ltd.....	Owen Sound.....	Owen Sound.
Paxton, Fred R.....	St. Catharines.....	St. Catharines.
Phinn, Geo. A.....	St. James Park, London.....	Middlesex Co.
Phippen & Son.....	Dawes Rd., Box 11, Coleman.....	East York Tp.
Richardson, J., & Son.....	Kerwood.....	Kerwood.
Rollins, D. W.....	136 Dundas St., Belleville.....	Thurlow Tp.
Snelgrove, A.....	Beaverton.....	Beaverton.
Sproat & Sproat.....	R. R. 4, Seaforth.....	Tuckersmith Tp.
Standard Brick Co.....	500 Greenwood Ave., Toronto.....	Toronto.
Superior Brick & Tile Co., Ltd.....	Fort William.....	Paipoonge Tp.
Thomson Ralph.....	Henityn.....	South Grey Tp.
Toronto Brick Co., Ltd.....	897 Bay St., Toronto.....	Toronto, Milton and York Tp.
Wagstaff Brick & Tile Yard.....	R. R. 4, Lindsay.....	Victoria Co.
Wallace, R., & Son.....	Toronto General Trusts Corp., 255 Bay St., Toronto.....	Widdifield Tp.
Wein, Aaron.....	Crediton.....	Huron Co.
Weitzel, John E.....	Tavistock.....	East Zorra Tp.
Wright, Geo., & Sons.....	Comber.....	Comber.
MANITOBA—		
Alsip Brick, Tile & Lumber Co., Ltd.....	537 Portage Ave., Winnipeg.....	Winnipeg.
Marion Brick Co.....	Box 30, St. Boniface.....	St. Boniface.
Snyder Brick Yards, Ltd.....	Portage la Prairie.....	Portage la Prairie.
Wardrop, D. M.....	Whittemouth.....	Whittemouth.
SASKATCHEWAN—		
Bruno Clay Works, Ltd.....	Saskatoon.....	Bruno.
Dominion Fire Brick and Clay Products, Ltd. (a).....	Box 99, Moose Jaw.....	Claybank.
International Clay Products, Ltd.....	Estevan.....	Estevan.
ALBERTA—		
Acme Brick Co., Ltd.....	125 Alberta Block, Edmonton.....	Cannell.
Alberta Clay Products Co., Ltd.....	Box 672, Medicine Hat.....	Medicine Hat.
Gunderson Brick & Coal Co., Ltd.....	Redcliff.....	Redcliff.
Johanson, Knut.....	Grande Prairie.....	Grande Prairie.
Little, J. B., & Sons, Ltd.....	9120-100th Ave., Edmonton.....	Edmonton.
Medicine Hat Brick & Tile Co., Ltd.....	Medicine Hat.....	Medicine Hat.
Redcliff Pressed Brick Co., Ltd. (a).....	Redcliff.....	Redcliff.
Redcliff Premier Brick Co., Ltd.....	Redcliff.....	Redcliff.
BRITISH COLUMBIA—		
Baker Brick & Tile Co., Ltd.....	3191 Douglas St., Victoria.....	Victoria.
Clayburn Co., Ltd. (a).....	850 W. Hastings St., Vancouver.....	Kilgard.
Gabriola Shale Products, Ltd.....	1304 Broad St., Victoria.....	Gabriola Island.
Glover, Frank (b).....	Princeton.....	Princeton.
Gorse, Percy A.....	Salmon Arm.....	Kamloops.
Haug, Wm., & Son.....	Kelowna.....	Kelowna.
Port Haney Brick Co., Ltd.....	846 Howe St., Vancouver.....	Port Haney.
Vancouver Brick & Tile, Ltd.....	Ft. Columbia Ave., Vancouver.....	New Westminster.

(a) Includes production of refractories.

(b) Produces bentonite.

DIRECTORY OF FIRMS—Continued

Canadian Producers of Stoneware and Pottery from Domestic Clays

Name	Head office address	Location of plant
NEW BRUNSWICK— The Foley Pottery, Ltd. (a).....	Saint John.....	Saint John.
ONTARIO— The Foster Pottery Co..... London Pottery Mfg. Co.....	Main St. W., Hamilton..... 95 Rectory St., London.....	Hamilton. London.
ALBERTA— Medalta Potteries, Ltd.....	Medicine Hat.....	Medicine H
BRITISH COLUMBIA— Baker Brick & Tile Co., Ltd.....	3191 Douglas Ave., Victoria.....	Victoria.

(a) Includes production of refractories.

Cement Industry

QUEBEC— Canada Cement Co., Ltd.....	Canada Cement Bldg., Montreal.....	Hull and Montreal East.
ONTARIO— Canada Cement Co., Ltd..... St. Marys Cement Co., Ltd.....	Canada Cement Bldg., Montreal, Que..... 357 Bay St., Toronto.....	Belleville, Lakefield and Port Colborne. St. Marys.
MANITOBA— Canada Cement Co., Ltd.....	Canada Cement Bldg., Montreal, Que.....	Fort Whyte and Steep Rock.
ALBERTA— Canada Cement Co., Ltd.....	Canada Cement Bldg., Montreal, Que.....	Exshaw.
BRITISH COLUMBIA— British Columbia Cement Co., Ltd..... Coast Cement Co., Ltd.....	Box 10, Victoria..... Granville Island, Vancouver.....	Bamberton and Tod Inlet. Granville Island.

Lime Industry

NOVA SCOTIA— Dominion Steel & Coal Corp., Ltd..... Eastern Lime Co., Ltd.....	Sydney..... Windsor.....	Sydney. Windsor.
NEW BRUNSWICK— Bathurst Power and Paper Co., Ltd..... Purdy & Green, Ltd..... Randolph & Baker, Ltd..... Snowflake Lime, Ltd.....	Bathurst..... 323 Main St., Saint John..... Randolph..... 3 Pokiok Rd., Saint John.....	Bathurst. Saint John. Randolph. Saint John.
QUEBEC— Arnaud & Beaudry..... Boivin, Arthur..... Carswell, Robt. B..... Comardo, Jos..... Canada Lime & Stone, Ltd..... Cote, Xavier..... Desfond, Gaspard..... Dominion Lime Co..... Drouin, Eva C..... Filion, Narcisse..... Gagne, Octave..... Heon & Heon..... Lalumière, Joseph..... La Trappe de N. D. de Mistassini..... Limoges, Henri..... Mercure, C..... National Stone & Lime Co..... Shawinigan Chemicals Ltd..... Standard Lime Co., Ltd.....	Joliette..... Pont Rouge..... Bryson..... Cap St. Martin..... St. Marc des Carrières..... Metabetchouan..... St. Cuthbert..... Lime Ridge..... Ste. Justine..... St. Joachim..... St. Ulric..... St. Louis de France..... St. Dominique de Bagot..... Village des Pères..... 552 Poupart St., Montreal..... 9 rue St. Denis, St. Hyacinthe..... 4403 St. Hubert St., Montreal..... Box 2670, Montreal..... Joliette.....	Joliette. Pont Rouge. Bryson. St. Michel. St. Marc des Carrières. Metabetchouan. St. Cuthbert. Lime Ridge. Dorchester Co. St. Joachim. St. Ulric. St. Louis de France. St. Dominique de Bagot. Lac St. Jean. St. Michel. St. Dominique de Bagot. St. Marc des Carrières. Shawinigan Falls. St. Paul de Joliette, St. Marc des Carrières. St. Marc des Carrières. St. Jerome.
Trottier, David..... Villeneuve, R.....	St. Marc des Carrières..... St. Jerome.....	St. Marc des Carrières. St. Jerome.
ONTARIO— Bell, Harry..... Biederman, Albert G..... Brown's Lime Works..... Brunner, Mond Canada, Ltd..... Cameron, W. N..... Canada & Dominion Sugar Co., Ltd..... Canadian Gypsum Co., Ltd..... Dennis, Geo..... Dominion Rock Products, Ltd.....	R.R. 4, Chesley..... R.R. 1, Golden Lake..... Owen Sound..... Canadian Bank of Commerce Bldg., Toronto..... Carleton Place..... Chatham..... 1221 Bay St., Toronto..... Box 46, Rockwood..... 941 Dominion Square Bldg., Montreal, Que.....	Grey Co. Renfrew Co. Owen Sound. Amherstburg. Carleton Place. Chatham, Wallaceburg. Guelph. Wellington Co. Eganville.

DIRECTORY OF FIRMS—Continued

Lime Industry—Continued

Name	Head office address	Location of plant
ONTARIO—Continued		
Electro Metallurgical Company of Canada, Ltd.	Canada Life Bldg., Toronto	Welland.
Gypsum, Lime & Alabastine, Canada, Ltd.	Paris	Beachville, Hespeler, and Milton.
Innerkip Lime & Stone Co., Ltd.	Beachville	Beachville.
Jamieson Lime Co.	Renfrew	Renfrew Co.
Laurentian Stone Co., Ltd.	195 Nicholas St., Ottawa	Ottawa (*).
North American Cyanamid, Ltd.	1901 Royal Bank Bldg., Toronto.	Niagara Falls.
Shane Lime and Charcoal Co., Ltd.	Eganville	Fourth Chute.
MANITOKA—		
Gillis Quarries, Ltd.	Richard and Spruce Sts., Winnipeg.	Garson, Poplarfield.
Gypsum, Lime & Alabastine, Canada, Ltd.	Paris, Ontario.	Winnipeg.
Winnipeg Supply & Fuel Co., Ltd.	812 Boyd Bldg., Winnipeg.	Spearhill, Stonewall.
ALBERTA—		
Canadian Sugar Factories, Ltd.	Raymond.	Raymond.
Loders Lime Co., Ltd.	Kananaskis.	Kananaskis.
Summit Lime Works.	Box 273, Lethbridge.	N. Lethbridge.
BRITISH COLUMBIA—		
Lyon, F.	Hedley.	Hedley.
Pacific Lime Co., Ltd.	744 West Hastings St., Vancouver.	Texada Island.
Pacific Mills, Ltd.	Raymur Ave., Vancouver.	Ocean Falls.

(*) Stone quarried in Ontario is calcined in Hull, Que.

Sand-Lime Brick Industry

Names of companies	Location of plant
Standard Lime Co., Ltd.	1595 St. Gregoire St., Montreal, Que.
Harbour Brick Co., Ltd.	Fleet St., Toronto, Ont.
Hinde Bros.	Mount Dennis, Ont.
Toronto Brick Co., Ltd.	Victoria Park Ave., Toronto, Ont.
York Sandstone Brick Co., Ltd.	447 Victoria Park Ave., Toronto, Ont.

Sand and Gravel Operators

(In addition to the names listed below, production has been reported by the railway companies for ballast, counties and townships in Ontario for road use, and also a considerable amount by companies carrying on dredging operations.)

Name	Head office address	Location
NOVA SCOTIA—		
McSween, A. H.	Ironville.	Ironville.
Nova Scotia Department of Highways	Halifax.	Various.
Walker, A. G.	Bridgetown.	Near Bridgetown.
NEW BRUNSWICK—		
Anderson, A. W.	Fairville.	Fairville.
Likely, Jos. A., Ltd.	Saint John.	East Saint John.
Maxwell, Chas., & Son.	St. Stephen.	St. Stephen.
New Brunswick Department of Highways.	Fredericton.	Various.
QUEBEC—		
Alcoa Power Co., Ltd.	Chute a Caron P.O. Racine.	Racine.
Bigras, Honore.	St. Vincent de Paul.	Laval Co.
Bigras, Omer.	Ste-Rose Ouest.	Ste-Rose Ouest.
Bitumen Products Corp.	3590 St. Patrick St., Montreal.	Thurso.
Bonner Sand & Ballast, Ltd.	1434 St. Catherine St. W., Montreal.	South Durham, Abbotsford.
Brouillet Sand & Gravel.	Rawdon.	St. Julienne.
Coaticook, Ville de.	100 Child St., Coaticook.	Coaticook.
Cie de Sable, Ltée., La.	10 Third Ave., Quebec.	St. Charles River.
Consolidated Oka Sand & Gravel Co., Ltd.	248 McCord St., Montreal.	Lake of Two Mountains.
Dutrisac, Noel.	Ste-Rose.	Ste-Rose.
Foundation Maritime, Ltd.	135 Lower Water St., Halifax, N.S.	Baie Comeau.
Gosselin & Gosselin.	Chicoutimi.	Chicoutimi.
Granby, City of.	Granby.	Granby.
Latulippe, Phillippe & Amédée.	238 rue de la Ronde, Quebec.	St. Charles River.
Corporation de la ville de Magog, La.	Magog.	Magog.
Mercur, Camille.	9 rue St. Denis, St. Hyacinthe.	St. Dominique.
National Sand & Material Co., Ltd.	402 Harbour Bldg., Toronto, Ont.	Montreal.

DIRECTORY OF FIRMS—Continued

Sand and Gravel—Continued

Name	Head office address	Location
ONTARIO—Continued		
Ontario Paper Co., Ltd.	485 McGill St., Montreal	Baie Comeau.
Perron, J. E.	129 Jacques Cartier St., Chicoutimi	Chicoutimi.
Quebec Department of Highways	Quebec	Various.
Sherbrooke, City of	Sherbrooke	Sherbrooke.
Sorel Harbour Tugs, Ltd.	St. Joseph de Sorel	St. Francis River.
Standard Lime Co., Ltd.	Joliette	Ste-Emelie.
Standard Sand & Gravel, Ltd.	St. Felix de Valois	Joliette Co.
Venne, Oscar	Lachenaie	Lachenaie.
Allan, James	Seaforth	Seaforth.
Axford, J. B., & Sons	35 Elm St., St. Thomas	South Yarmouth.
Barnes, Wm. R., Co. Ltd.	243 Cumberland Ave., Hamilton	Springvale, Watertown, Hamilton, Nixon.
Bellyou, N. E.	R.R. 4, Trenton	Northumberland Co.
Birtch, Jas. A.	Richmond	Nepean Tp.
Boyd Bros.	Osgoode	Osgoode Tp.
Braas Bros. Hillcrest Sand Co.	R.R. 3, Niagara Falls	Stamford.
Bradt, E. S.	R.R. 5, Cayuga	Haldimand.
Brantford, City of	Brantford	Brantford.
Butler, M. J.	R.R. 2, Bayfield	Goderich Tp.
Cameron, Chas. M.	R.R. 1, Glencoe	Mosa Tp.
Campbell, Jeremiah	R.R. 3, Dashwood	Dashwood.
Conlin, Herbert L.	Highland Creek	Scarboro Tp.
Connell Bros.	Clinton	Clinton.
Consolidated Sand & Gravel Ltd.	402 Harbour Building, Toronto	Durham, Fuller, Paris, Wat- terford.
Cudmore, Mrs. Alice	Hensall	Usborne Tp.
Cudmore, Bertha	R.R. 6, Thamesville	Howard Tp.
Curran & Briggs, Ltd.	203 Manning Chambers, Toronto	Desbarats, near Dunford, Echo Bay.
Cuthbert, C. E.	Curries	Curries.
Dominion Concrete Co., Ltd.	Van Buren St., Kemptville	Grenville Co.
Erb, John	R.R. 2, Zurich	Near Zurich.
Ferguson, Richard W.	72 Pearl St. W., Brockville	Gananoque.
Forrester, Wm. E.	Morewood	Winchester Tp.
Frid Bros., Ltd.	Main W. and Macklin St., Hamilton	Hamilton.
Grandmatre, D.	19 Olmstead St., Eastview	Rockcliffe Village.
Hill, John D.	R.R. 6, Woodstock	East Zaira Tp.
Howard Sand & Gravel Co., Ltd.	Aldershot	E. Flamboro Tp.
Hydro Electric Power Commission	620 University Ave., Toronto	Dist. of Patricia, Dist. of Kenora.
Johnston, G. F.	R.R. 2, Wilton Grove	Westminster Tp.
Kilbourne, H., & Son	145½ Wharcliffe Road S., London	London.
Klopf, B. W.	R.R. 3, Zurich	Hay Tp.
Macklown, John L.	Bluevale	Turnberry Tp.
Machan, Andrew	West Monkton	Grey Tp.
McIntyre, John	R.R. 1, Elora	Filkington Tp.
McLeish Estate	Parkhill	Parkhill.
McQuillan, Wm. F.	R.R. 1, Lucknow	W. Wawanosh Tp.
Nevill, Thomas, & Son	R.R. 5, Aylmer W.	Malahide Tp.
Ontario Department of Highways	Toronto	Various.
Ontario Department of Northern Develop- ment	Toronto	Various.
Page, Jacob	Fenwick	Fenwick.
Quigleys	Bartonville	Watertown.
Sarjeant Co., Ltd., The	49 Dunlop St., Barrie	Barrie.
Skinner, R.	Exeter	Usborne Tp.
Smythe, C., Ltd.	Carlton and Church Sts., Toronto	Etobicoke Tp.
Spratt, J. H.	Billings Bridge	Gloucester Tp.
Stewart, Fenwick	R.R. 5, Clinton	Stanley Tp.
Stover, Elmer	R.R. 4, Tillsonburg	Middleton Tp.
Thompson, H. J.	R.R. 2, Clinton	Goderich Tp.
Towland Construction Co., Ltd.	294 Dundas St., London	Wawanosh Tp.
Vallery, H. J.	3 Beaty Ave., Toronto	Belwood.
White, Homer, & Co.	Pictou	Hallowell Tp.
White, Rachel, Miss	R.R. 7, London	Middlesex Co.
Wilks	26 Railway St., Woodstock	Woodstock.
Willox, Hervey	985 Bridge St., Niagara Falls	Stamford Tp.
Woollatt Fuel & Supply Co., Ltd.	2171 Ottawa St., Walkerville	Mersea Tp.
Workman, Jerome	R.R. 1, Drumbo	Blenheim Tp.
Wright & Co.	960 Queen St., Sault Ste. Marie	Mile 5, A.C.R.
Wylie, Greer	R.R. 1, Wingham	Turnberry Tp.
MANITOBA—		
Brandon, City of	Brandon	Brandon.
Building Products & Coal Co., Ltd.	Christie St., Winnipeg	Birds Hill.
Cumming & Dobbie	233-9th St., Brandon	Brandon.
Dominion Mines and Resources Department	Ottawa, Ont.	Riding Mountain National Park.
Greater Winnipeg Water District	185 King St., Winnipeg	Mile 31 and Mile 80, G.W.- W.D.R.
Manitoba Department of Highways	Winnipeg	Various.
McCurdy Supply Co., Ltd.	1034 Arlington St., Winnipeg	Molson.
Riley, W. J.	Molson	Rosser.
Rosser, Municipality of	Rosser	Rosser.
Winnipeg Hydro Electric System	55-59 Princess St., Winnipeg	Sec. 31, Tp. 15, R. 14 E.

DIRECTORY OF FIRMS—Continued

Sand and Gravel—Concluded

Name	Head office address	Location
SASKATCHEWAN—		
Dominion Mines and Resources Department.	Ottawa, Ont.....	Prince Albert Natoinal Park
North Battleford, City of.....	1201 King St., North Battleford.....	North Battleford.
Saskatchewan Department of Highways.....	Regina.....	Various.
Yorkton, City of.....	Yorkton.....	Yorkton.
ALBERTA—		
Alberta Department of Highways.....	Edmonton.....	Various.
Cristall Sand.....	10165-104th St., Edmonton.....	Perryvale.
Dominion Mines and Resources Department.	Ottawa, Ont.....	National Parks.
Nanton, Town of.....	Nanton.....	Nanton.
National Parks Highways.....	Ottawa, Ont.....	National Parks.
Sutherland, M.....	Box 307, Olds.....	Westerdale Municipality.
BRITISH COLUMBIA—		
Armstrong, City of.....	Armstrong.....	Vernon Mining Div.
British Columbia Department of Highways.	Victoria.....	Various.
Buena Vista Mining Co., Ltd.....	Trail.....	Portland Canal.
Burnaby, Corporation of the District.....	Edmonds, New Westminster.....	Burnaby.
Cascade Rock & Gravel Co., Ltd.....	Lynnmoor.....	Lynnmoor.
Chilliwack, City of.....	Chilliwack.....	Chilliwack.
Consolidated Mining and Smelting Company of Canada, Limited.....	Trail.....	Trail.
Cranbrook, City of.....	Cranbrook.....	Cranbrook.
Deeks Sand & Gravel Co., Ltd.....	101 W. 1st Avenue, Vancouver.....	N. Vancouver and Coquit- lam.
Dominion Mines and Resources Department.	Ottawa, Ont.....	National Parks.
Fernie, City of.....	Fernie.....	Near Fernie.
Gilley Bros., Ltd.....	902 Columbia St. W., New Westminster.....	Port Coquitlam.
Hillside Sand & Gravel.....	1075 Main St., Vancouver.....	Hillside, Howe Sound.
Kamloops, City of.....	Kamloops.....	Kamloops.
National Parks Highways.....	Ottawa, Ont.....	National Parks.
Nelson, City of.....	Nelson.....	Nelson.
Port Alberni, City of.....	Port Coquitlam.....	New Westminster.
Prince Rupert, City of.....	Prince Rupert.....	Prince Rupert.
Producers Sand & Gravel Co. (1929), Ltd.....	1902 Store St., Victoria.....	Royal Bay.
Trail, City of.....	Trail.....	Near Trail.

Stone Quarrying Industry

Granite

NOVA SCOTIA—		
Bower, A. R.....	Box 255, Shelburne.....	Birchtown.
*Dauphinee, W. T.....	Shelburne.....	Shelburne.
Dibblee Construction Co., Ltd.....	248 Albert St., Ottawa, Ont.....	East Sackville.
*Nixon, W. H.....	R.R. 3, Middleton.....	Nictaux West.
*Rice Bros.....	Lawrencetown.....	Nictaux West.
*Rice, W. D.....	Middleton.....	Nictaux West.
*Shelburne Marble & Granite Works.....	Shelburne.....	Birchtown.
NEW BRUNSWICK—		
*Granite St. Paving & Con. Co., Ltd.....	Rothsay Ave., Saint John.....	Hampstead.
*Milne Coutts & Co., Ltd.....	St. George.....	St. George.
*B. Mooney & Sons Realty, Ltd.....	Box 727, Saint John.....	Hampstead.
*O'Brien & Baldwin.....	St. George.....	St. George.
QUÉBEC—		
Alcoa Power Co., Ltd.....	Chute a Caron.....	Chicoutimi Co.
B. & R. Granite Quarry.....	Beebe.....	Ogden Tp.
Bernier, Stanley.....	St. Joseph d'Alma.....	St. Joseph d'Alma.
*Bernier & Fils.....	Box 491, Roberval.....	Roberval.
*Berube, Lucien.....	Brownsburg.....	Chatham Tp.
*Brodie's, Ltd.....	1070 Bleury St., Montreal.....	Mt. Johnson, Guenette, Gran- iteville.
Bullock, Wright.....	Graniteville.....	Ogden Tp.
*Bussière, C. L.....	St. Sebastien.....	St. Cecile.
Chicoutimi, City of.....	Chicoutimi.....	St. Paul Tp.
*Cloutier, R. L.....	Beebe.....	Beebe.
Delwaide, Anselme.....	Chicoutimi.....	Simard Tp.
*Deschambault Quarry Corp.....	56 Rue St. Pierre, Quebec.....	St. Gerard de Wolfe.
Diamond Granite Co.....	Beebe.....	Stanstead Tp.
Dontigny, Alphonse.....	Shawinigan Falls.....	St. Flore.
*Drummond Quarry Ltd.....	Drummondville.....	Drummondville.
*Dubois, L.....	Rivière a Pierre.....	Colbert Tp.
Dumas, Auguste.....	Rivière a Pierre.....	Bois Tp.
Foundation Co. of Canada, Ltd.....	485 McGill St., Montreal.....	Saguenay Co.
*Gagnon, Arthur.....	76 rue St. Louis, Quebec.....	Chemin St. Louis.

NOTE.—* Firms operating dressing works in conjunction with quarry.

DIRECTORY OF FIRMS—Continued

Granite—Concluded

Name	Head office address	Location
QUEBEC—Concluded		
*Gingras & Frère Ltée.....	St. Marc des Carrieres.....	Stanhope.
*Granit National Ltée., Le.....	St. Joseph d'Alma.....	Lac St. Jean Co.
Granit Rouge de St. Canut Enrg.....	757 Mont Royal Est, Montreal.....	St. Canut.
Grenier Elie,.....	Glenada.....	Glenada.
*Guenette Granite Co., Ltd.....	Guenette.....	Campbell Tp.
Haselton, W. M.....	Beebe.....	Stanstead Co.
Henrikson and Hokansson.....	Graniteville.....	Graniteville.
*Inter-Provincial Construction Ltd.....	Vaudreuil.....	Rigaud.
Jonquière, Ville de.....	Jonquière.....	Jonquière.
Komo Construction Enrg.....	812½ St. Vallier, Quebec.....	
Lacasse & Boulais.....	Box 23, Beebe.....	Beebe.
Lavers, Clifford.....	Box 72, Beebe.....	Beebe.
McIntosh, Robert.....	Beebe.....	Ogden Tp.
*Perron, J. S.....	Rivière-à-Pierre.....	Bois Tp.
Quebec Department of Highways.....	Quebec.....	Various.
Port Alfred, Town of.....	Port Alfred.....	Port Alfred.
St. Bruno Quarry & Paving Co., Ltd.....	636 Ave., Querbes, Outremont.....	Chambly Co.
*Silver Granite Co., Ltd.....	180 Côte d'Abraham, Quebec.....	Rivière-à-Pierre, St. Samuel
*Stanstead Granite Quarries Co., Ltd.....	Beebe.....	Graniteville.
St. Joseph d'Alma, Town of.....	St. Joseph d'Alma.....	Lac St. Jean Co.
*Thibodeau and St. Pierre.....	Rivière-à-Pierre.....	Bois Tp.
*Wilkinson, Frank L.....	Beebe.....	Stanstead Co.
ONTARIO—		
*Building Products, Ltd.....	Box 2529 Montreal, Que.....	Verona, Mountain Grove.
Fort William, City of.....	Fort William.....	Mt. McKay.
Grenville Crushed Rock Co., Ltd.....	917 Keefer Bldg., Montreal.....	Hawk Lake.
*Hall, R. R.....	Parry Sound.....	Parry Sound.
*Horne, Wm.....	Butler via Ignace.....	Butler.
Hydro-Electric Power Commission.....	620 University Ave., Toronto.....	Dist. of Patricia.
McKee, Wm.....	Lansdowne.....	Lansdowne.
Ontario Rock Co., Ltd.....	320 Bay St., Toronto.....	Belmont Tp.
MANITOBA—		
*Winnitoba Marble Co., Ltd.....	1180 Wall St., Winnipeg.....	Hawk Lake.
BRITISH COLUMBIA—		
*B.C. Monumental Works, Ltd.....	27 Kingsway, Vancouver.....	Granite Island.
Canadian National Railways.....	Montreal, Que.....	Various.
Coast Quarries, Ltd.....	1840 Georgia St. W., Vancouver.....	Granite Falls.
Gilley Bros., Ltd.....	902 Columbia St. W.....	New Westminster.
Huchcroft Quarries.....	Box 54, Cranbrook.....	Cranbrook.
*Nelson Granite & Monumental Co.....	Box 865, Nelson.....	Nelson.
Port Alberni, City of.....	Port Alberni.....	Alberni.
Prince Rupert, City of.....	Prince Rupert.....	Prince Rupert.
*Vancouver Granite Co., Ltd.....	1007 Royal Bank Bldg., Vancouver.....	Nelson Island.
*Vernon Granite & Marble Co.....	Okanagan Landing.....	Yale Dist.
*Wilson, James S.....	Sirdar.....	Sirdar.

Limestone

NOVA SCOTIA—		
Eastern Lime Co., Ltd.....	Windsor.....	Windsor.
Kirkpatrick, Robie.....	Kirkhill.....	Kirkhill.
MacLean & Co.....	Oxford.....	Nappan.
McDonald, J. A.....	Glen Alpine.....	Hillcrest.
McVicar & McDonald.....	Bailey's Brook.....	Bailey's Brook, McLellan's Brook and Lime Rock.
Mersey Paper Co., Ltd.....	Brooklyn.....	East River.
Montgomery, D. J.....	Meadow.....	Meadow and Skir Dhu.
Mosher, O. P.....	Musquodoboit Harbour.....	Musquodoboit Harbour.
North Inverness Lime Co. Association.....	Cheticamp.....	North Inverness.
Nova Scotia Department of Agriculture.....	Truro.....	Various.
Smiley, Howard.....	Newport.....	Hants Co.
NEW BRUNSWICK—		
Randolph & Baker.....	Randolph.....	Randolph.
Snowflake Lime, Ltd.....	Saint John.....	Saint John.
QUEBEC—		
Andorno, J. E.....	Cep St. Martin.....	Cap St. Martin.
Buillargeon & Faubert.....	62 Union Bldg., St. Lambert.....	Caughnawaga.
Beaudry, J. Pitro.....	41 rue Taché, Joliette.....	Bldv., Querbes.
Boily, Albert.....	Baie St. Paul.....	Charlevoix Co.
Boivin, Ladislav.....	Baie St. Paul.....	Baie St. Paul.
Canada Cement Co., Ltd.....	Phillips Square, Montreal.....	Hull Tp.
Canadian Quarries, Ltd.....	4650 Rosemont Blvd., Montreal.....	Montreal.
Carrière du Cap Martin Enrg.....	636 Querbes, Outremont.....	Cap St. Martin.
Carrière Gravel, Ltd.....	Chateau Richer.....	Chateau Richer.

NOTE.—* Firms operating dressing works in conjunction with quarry.

DIRECTORY OF FIRMS—Continued

Limestone—Continued

Name	Head office address	Location
QUEBEC—Concluded		
*Carrière Marciel, Ltd.	St. Michel Station.	Chateauguay.
Carrière de St. Barthélemi, Ltd.	St. Barthélemi.	St. Barthélemi.
Carrières St. Marc, Ltd.	St. Marc des Carrières.	St. Marc des Carrières.
Carrière St. Maurice, Ltd.	307 rue Alexandre, Trois Rivières.	Champlain Co.
*Cercle Agricole.	St. Godefroy.	St. Godefroy.
*Charron, Arthur	Belanger.	Laval Co.
*Charbonneau & Frère.	St. François de Sales.	Laval Co.
Chenel, Rev. J. E.	Port Daniel East.	Port Daniel East.
Delisle, E.	Pont Rouge.	Pont Rouge.
*Department of Justice.	Ottawa.	St. Vincent de Paul.
Deraiche, Madame F. X.	Port Daniel East.	Port Daniel.
*Deschambault Quarry Corp.	56 Rue S. Pierre, Quebec.	St. Marc des Carrières.
*Dominion Lime Co.	Lime Ridge.	Lime Ridge.
Drouin, Madame Eva Cimon.	Ste. Justine.	Ste. Justine.
Dubé, Philippe.	St. Clement.	St. Paul de la Croix.
Durocher, Cyrille.	11021 Notre Dame E., Montreal.	Montreal East.
*Faubert, Alphonse.	De Léry.	Chateauguay Co.
Filion, Adelard.	Lachute.	Lachute.
Filion, Donat et Frère.	123 rue Papineau, Hull.	Hull.
Francoeur, J. B.	Kelley.	Kelley.
Fuger and Smith, Ltd.	Pointe Claire.	Pointe Claire.
Gagné, Octave.	St. Ulric.	Matane Co.
Gagnon & Bourassa.	115½ Ave. Cartier, Québec.	Chateau Richer.
*Gauthier, Olivier.	St. Marc des Carrières.	St. Marc des Carrières.
Gauthier, René.	Village Bélanger.	Laval Co.
*Gingras et Frère, Ltée.	St. Marc des Carrières.	St. Marc des Carrières.
Giroux, F. A.	210 Ave. Royal, St. Louis de Courville.	St. Louis de Courville.
Harrison, Georges et Cie.	Poncheville.	Matane Co.
Kennedy Construction Co., Ltd.	407 McGill St., Montreal.	Actonville.
Labege and Marchand.	Chateauguay.	Chateauguay.
Lacoulaine, T.	Chateau Richer.	Chateau Richer.
Lagace, Nap.	L'Abord-a-Plouffe.	Rouge la Martin.
*Lapointe, A. and E.	12034 Lachapelle, Montreal.	Cartierville.
Lapointe, Emile.	St. Dominique, Bagot.	St. Dominique, Bagot.
Laurentian Stone Co., Ltd.	195 Nicholas St., Ottawa.	Wrightville.
Leclerc, Edouard.	St. Joachim de Montmorency.	Montmorency Dist.
Leclerc, J. J.	Rimouski.	Rimouski.
Leclerc & Robitaille.	c/o Le Granit National, Ltée., St. Joseph d'Alma.	Roberval.
*Lecrenier, Victor.	3465 Rue Berrie, Montreal.	Cap St. Martin.
Leger and Charlton, Ltd.	400 Notre Dame St., Lachine.	Lachine.
Levesque, Armand.	Roberval.	Roberval.
*Martineau Fils, Ltée.	517 Marie-Anne, E. Montreal.	Pont Viau, Montreal.
Mathew Devito Construction, Ltd.	6138 rue Hamilton, Montreal.	Pointe Claire.
Mercure, C.	9 rue St. Denis, St. Hyacinthe.	Bagot Co.
Miner, R. H., Co., Ltd.	7411 Delanaudière St., Montreal.	St. Laurent.
Montreal Quarry, Ltd.	1340 Bellechasse, Montreal.	Montreal.
National Quarries, Ltd.	6301 Park Ave., Montreal.	Cote St. Michel.
*Noel, Oscar.	Lachevrotière.	St. Marc des Carrières.
Paillé, Jas.	44 Wright St., Hull.	Hull.
Paquette, Lévis, et Cie.	Charlesbourg.	Quebec Co.
*Pearson, Honoré.	Cap St. Martin.	Cap St. Martin.
Quebec Department of Highways.	Port Daniel East.	Bonaventure Co.
Rousseau, T. E.	Quebec.	Various.
St. Francis Rock Products and Equipment, Ltd.	48-2nd Ave., Quebec.	Val Brilliant.
Schetagne, Willrid.	8050 Bloomfield Ave., Montreal.	St. Laurent Parish.
Shawinigan Chemicals, Ltd.	309 Bord du Lac, Pointe-Claire.	Côte St. Charles.
Standard Clay Products, Ltd.	Box 2670, Montreal.	Bedford.
Standard Lime Co., Ltd.	Box 189, St. Johns.	St. Johns Co.
St. Laurent Quarry, Ltd.	Joliette.	St. Paul de Joliette.
St. Onge, Omer.	299 Monkland Blvd., St. Laurent.	Belanger Tp.
*Stone & Quarry, Ltd.	St. Dominique de Bagot.	St. Dominique.
Trappist Fathers.	6217 De Lansudière, Montreal.	St. François de Sales.
Tremblay, Napoleon.	Village des Pères.	Roberval.
*Trudel, Napoleon & Fils.	31 Rue Joffre, Hull.	Hull.
Union des Carrières & Pavages, Ltée.	Ste. Irénée.	Saguenay Co.
Valleyfield, City of.	3 Blvd. Charest, Quebec.	Charlesbourg.
Verreault, E., Ltd.	Valleyfield.	New Salaberry.
Villeneuve, François.	194 rue du Pont, Quebec.	Giffard.
	Pointe-au-Pic.	Pointe-au-Pic.
ONTARIO—		
Bourgie, J. B.	Box 50, Embrun.	Russell Co.
Brunner, Mond Canada, Ltd.	Bank of Commerce Bldg., Toronto.	Essax Co.
Canada Cement Co., Ltd.	Phillips Square, Montreal, Que.	Belleville and Lakefield.
Canada Crushed Stone Co., Ltd.	Sun Life Bldg., Hamilton.	Dundas and Hagersville.
Clyde Construction Co., Ltd.	Carleton Place.	Carleton Place.
Coldwater Crushed Stone, Ltd.	Coldwater.	Simcoe Co.
Cook, J. S.	Warton.	Brace Co.
Edgar Irvine Co., Ltd.	Alexandria.	Harrowsmith, Alexandria.
Grenon, Joseph V.	Casselman.	Casselman.
Grenville Crushed Rock Co., Ltd.	917 Keefer Bldg., Montreal.	Oxford Mills.
Gypsum Lime & Alabastine, Canada, Ltd.	Paris.	Beachville and Milton.

NOTE.—* Firms operating dressing works in conjunction with quarry.

DIRECTORY OF FIRMS—Continued

Limestone—Concluded

Name	Head office address	Location
ONTARIO—Concluded		
Hagersville Quarries, Ltd.	Hagersville.	Hagersville.
Haldimand Quarries & Cons., Ltd.	Hagersville.	Hagersville.
*Henniger, M. G.	Smith's Falls.	North Elmsley Tp.
Innerkip Quarries, Ltd.	Fleet St., Toronto.	Innerkip.
Jamieson Lime Co.	Renfrew.	Renfrew.
*Jupp, A. E., Construction Co., Ltd.	170 Berkeley St., Toronto.	Campbellford.
Kehoe, P. J.	Brechin.	Mara Tp.
*Kingston Penitentiary.	Department of Justice, Ottawa.	Portsmouth.
Kirby, T. Sidney Co., Ltd.	215 Sussex St., Ottawa.	Gloucester Tp.
Kirkfield Crushed Stone, Ltd.	Fleet St., Toronto.	Kirkfield.
Lake St. John Quarry Co., Ltd.	Sun Life Bldg., Hamilton.	Longford Mills.
Law Construction, Ltd.	225 Sterling Road, Toronto.	Owen Sound.
Limestone Products, Ltd.	1104 Hermant Bldg., Toronto.	N. Orillia Tp.
McGinnis & O'Connor.	412 King St., Kingston.	Collins Bay.
Noranda Mines, Ltd.	804 Royal Bank Bldg., Toronto.	Haileybury.
North American Cyanamid, Ltd.	Royal Bank Bldg., Toronto.	Beachville.
Northern Development Department.	Parliament Bldgs., Toronto.	Various.
Ontario Department of Highways.	Parliament Buildings, Toronto.	Various.
Pembroke, Corporation of.	Pembroke.	Pembroke.
Pirson, John.	Stevensville.	Bertie Tp.
*Queenston Quarries, Ltd.	76 Sun Life Bldg., Hamilton.	St. Davids.
Walker Bros.	Box 586, Thorold.	Stamford Tp.
Wehman, John.	23 Plum St., Kingston.	Kingston Tp.
Windmill Point Crushed Stone Co., Ltd.	225 Sterling Rd., Toronto.	Port Colborne.
MANITOBA—		
*Gillies Quarries, Ltd.	Richards and Spruce Sts., Winnipeg.	Garson, Poplarfield.
Manitoba Department of Highways.	Winnipeg.	
*Tyndall Quarry Co., Ltd.	1591 Erin St., Winnipeg.	Garson.
*Western Stone Co., Ltd.	401 Royal Bank Bldg., Winnipeg.	Garson.
Winnipeg, City of.	Winnipeg.	Stony Mountain.
Winnipeg Supply & Fuel Co., Ltd.	812 Boyd Bldg., Winnipeg.	Spearhill, Stonewall.
ALBERTA—		
Loder's Lime Co., Ltd.	Kananaskis.	Kananaskis.
Summit Lime Works.	Box 273, Lethbridge.	Lethbridge.
BRITISH COLUMBIA—		
Beale, F. J.	Van Ada.	Van Ada.
British Columbia Department of Highways.	Victoria.	Various.
B.C. Pulp and Paper Co., Ltd.	Bank of Nova Scotia Bldg., Vancouver.	Quatsino Mining Div.
Christensen, P. (Koeve River Lime Quarries).	Namu.	Namu.
Consolidated Mining & Smelting Company of Canada, Ltd.	Trail.	Procter.
Deekes Sand & Gravel Co., Ltd.	101 W. 1st Ave., Vancouver.	Seymour Creek, Coquitlam.
*Johnson, August (b).	Ritchie.	Ritchie.
Pacific Lime Co., Ltd.	744 Hastings St. W., Vancouver.	Texada Island.
*Priore & Vannucchi.	Box 315, Trail.	Fife.
Trail, City of.	Trail.	Trail.
Western Canada Lime Co., Ltd.	Box 535, Chilliwack.	Chilliwack.

*Firms operating dressing works in conjunction with quarry.

(b) Marl producer.

Marble

QUEBEC—		
Lemieux Malcome (Canada Marble & Lime Co. Reg.)	1502 St. Catherine St. W., Montreal.	L'Annonciation.
*Wallace Sandstone Quarries, Ltd.	1135 Beaver Hall Hill, Montreal.	Philipsburg.
White Grit Co.	Hurdman Rd., Ottawa.	Portage du Fort.
ONTARIO—		
*Bolender Bros.	Haliburton.	Haliburton.
Bonter Marble & Calcium Co., Ltd.	Box 61, Marmora.	Marmora Tp.
Cooper, Alf.	2 Royal Bank Bldg., Fort William.	Needing Tp.
Orser, S. H. (ornamental stone products).	Verona.	Verona.
*Rock Construction Co., Ltd.	328 Dupont St., Toronto.	Bancroft.
Silvertone Black Marble Quarries, Ltd.	305 O'Connor St., Ottawa.	Stormont Co.
Stockloser, Karl.	Madoc.	Eldorado.
MANITOBA—		
*Winnitoba Marble Co., Ltd.	1180 Wall St., Winnipeg.	Fisher Branch (R.R.).
BRITISH COLUMBIA—		
Canadian Marble & Granite Works, Ltd.	10702-101st St., Edmonton, Alta.	Marblehead.

DIRECTORY OF FIRMS—Continued

Sandstone

Name	Head office address	Location
NOVA SCOTIA—		
Fairview Crushed Stone Co., Ltd.....	609 Gottingen St., Halifax.....	Fairview.
Nova Scotia Highways.....	Halifax.....	Various.
*Wallace Sandstone Quarries, Ltd.....	1135 Beaver Hall Hill, Montreal, Que.....	Wallace.
NEW BRUNSWICK—		
*Smith, E. A.....	Shediac.....	Shediac.
QUEBEC—		
Beauharnois Light, Heat & Power Co.....	107 Craig St. W., Montreal.....	Beauharnois.
Blais, Jos.....	10 Ave. Mont-Marie-Levis.....	St. Louis de Pintendre, St. Nicholas.
Canadian Rock Products, Ltd.....	Box 159, Quebec.....	Kamouraska Co.
Citadel Brick, Ltd.....	14 St. Joseph St., Quebec.....	Lauson.
Rousseau, T. E.....	48-2nd Ave., Quebec.....	Leggats Point, New Carlisle.
Sherbrooke, City of.....	Sherbrooke.....	Sherbrooke.
Vezina, Jos.....	Ste. Foy.....	Ste. Foy.
ONTARIO—		
Campbell Sandstone Quarries, Ltd.....	165 Main St., Westboro.....	Nepean Tp.
Corner, Austin.....	Inglewood.....	Peel Co.
Mountain Sandstone Quarry.....	Box 307, Georgetown.....	Esquesing Tp.
Sykes, Thos.....	Georgetown.....	Glen Williams.
Terra Cotta Quarries.....	Glen Williams.....	Glen Williams.
ALBERTA—		
*Oliver, Wm.....	Cochrane.....	Cochrane.
BRITISH COLUMBIA—		
Consolidated Mining & Smelting Co., Ltd....	Trail.....	Kimberley.
McDonald, J. A. & C. H., Ltd.....	1571 Main St., Vancouver.....	Haddington and Gabriola Islands.

Slate

QUEBEC—		
Broughton Soapstone & Quarry Co., Ltd.....	Broughton Station.....	St. Thérèse Tp.
Williamson & Crombie.....	Kingsbury.....	Kingsbury.
ONTARIO—		
*Crespey Slate Products, Ltd.....	Madoc.....	Madoc.
*Canadian Slate Products, Ltd.....	11 King St. W., Toronto.....	Madoc.
BRITISH COLUMBIA—		
Brown, O. M.....	Kapoor.....	Kapoor.

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Manufactures of Non-Ferrous Metals: Aluminium Products—Brass and Copper Products—White Metal Alloys—Jewellery and Silverware—Electrical Apparatus and Supplies—Miscellaneous Non-Ferrous Metal Products—Non-Ferrous Smelting and Refining.

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Chemicals and Allied Products: Coal Tar Distillation—Acids, Alkalies and Salts—Compressed Gases—Explosives, Ammunition and Fireworks—Fertilizers—Medicinal and Pharmaceutical Preparations—Paints, Pigments and Varnishes—Soaps, Washing Compounds and Cleaning Preparations—Toilet Preparations—Inks—Adhesives—Polishes and Dressings—Hardwood Distillation—Miscellaneous Chemical Products, including (a) Boiler Compounds, (b) Cellulose Products, (c) Insecticides, (d) Sweeping Compounds, (e) Disinfectants, (f) Matches, (g) Dyes and Colours, (h) Chemical Products, n.e.s.

Annual Bulletins—In addition to the foregoing printed reports, a series of bulletins is issued annually, each of which presents the principal statistics relative to production: (a) in a particular industry, e.g. Automobiles—Petroleum Products, etc., (b) in each of the four main groups of industries. These are published in mimeograph form from time to time during the year as the necessary material becomes available. Commodity bulletins are also issued on stoves, washing machines, wire nails, wire fencing, sulphuric acid, ammonium sulphate, etc.

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Coal and Coke Statistics for Canada.
Automobile Statistics for Canada.**

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Consumption of Chemicals in Municipal Waterworks. (Biennial).
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-D-28

CANADA—DEPARTMENT OF TRADE AND COMMERCE
DOMINION BUREAU OF STATISTICS
MINING, METALLURGICAL AND CHEMICAL BRANCH

ANNUAL REPORT
ON THE
MINERAL PRODUCTION OF
CANADA
DURING THE CALENDAR YEAR

1937

Published by Authority of the Hon. W. D. Euler, M.P.,
Minister of Trade and Commerce



OTTAWA
J. O. PATENAUDE, I.S.O.
PRINTER TO THE KING'S MOST EXCELLENT MAJESTY
1939

Price, 50 cents

LIST OF PUBLICATIONS

PREPARED IN THE MINING, METALLURGICAL AND CHEMICAL BRANCH DOMINION BUREAU OF STATISTICS

MINERAL PRODUCTION (Mining and Metallurgy).

General Reports

Preliminary Reports (semi-annual) on the Mineral Production of Canada.

Monthly Reports on Canada's Leading Mineral Products.

Annual Report on the Mineral Production of Canada. (In one volume.)

A comprehensive record of the mining industry embodying historical and world data, detailed information on mineral production, imports and exports for Canada and general statistics relative to the mining industry on capital investment, employment, fuel consumption and power equipment arranged in 9 chapters, each dealing with a particular branch of the industry. Statistics on production and trade in mineral products appear in detail in the appropriate chapters. Fully indexed. Chapter titles are: Canada—The Gold Mining Industry—The Silver Mining Industry—The Nickel-Copper Industry—Miscellaneous Metal Mining Industries—The Non-Ferrous Smelting and Refining Industry—The Coal Mining, Coke, Natural Gas, Peat and Petroleum Industries—Non-Metal Mining Industries (Other than Fuels)—The Clay Products and Other Structural Materials Industries—Notes on the Methods of Computing Values—Index—Directory.

COAL—

Monthly and Quarterly Reports on Coal and Coke Statistics for Canada.

A condensed report on production, imports and exports of coal and coke is issued monthly, publication being made about the twentieth of the next following month.

A more general review is published quarterly, showing statistics for each month, for the quarter, and for the year to date on the output by coal-mining districts and by provinces, imports and exports by ports and by kinds of coal, employment in coal-mining, and tonnage lost. There is also a section on coke showing production, imports, exports, distribution and consumption by months and by provincial groups.

Annual Report on Coal Statistics for Canada.

Text and tables showing for Canada, and for each of the coal-producing provinces, historical and current data on output, tonnage lost, disposition of coal from the mines, domestic and foreign shipments, exports and imports by ports, consumption of coal, prices, employment, salaries and wages paid, power equipment, capital investment, etc.

ANNUAL BULLETINS—

Metals—The Gold Mining Industry in Canada, which includes Alluvial Gold Mining, Auriferous Quartz Mining, Copper-Gold-Silver Mining, and tables showing Canadian and world production of Gold.—The Silver Mining Industry in Canada, which includes Silver-Cobalt-Arsenic Mining, Silver-Lead-Zinc Mining, and tables showing Canadian and world production of Arsenic, Cobalt, Lead, Silver and Zinc.—The Nickel-Copper Mining, Smelting and Refining Industry, which includes Canadian and world production of Nickel.—The Canadian and World Production of Copper.—Metals of the Platinum Group.—The Production of Miscellaneous Metals, including Antimony, Beryl, Bismuth, Cadmium, Chromite, Lithium, Manganese, Mercury, Molybdenite, Radium, Selenium, Tin, Titanium, Tungsten.—The Non-Ferrous Smelting and Refining Industry.

Non-Metals—Abrasives—Asbestos—Coal—Feldspar—Gypsum—Iron Oxides—Mica—Natural Gas—Petroleum—Quartz—Salt—Talc and Soapstone—Miscellaneous Non-Metallic Minerals, including Actinolite, Barytes, Bituminous Sands, Fluorspar, Graphite, Magnesitic dolomite, Bog Manganese, Natural Mineral Waters, Phosphate, Silica Brick, Sodium Carbonate, Sodium Sulphate, Sulphur (Pyrites).

Structural Materials—Cement—Clay and Clay Products—Lime—Sand and Gravel—Stone.

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CANADA—DEPARTMENT OF TRADE AND COMMERCE
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MINING, METALLURGICAL AND CHEMICAL BRANCH

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NOTES ON STATISTICS OF PRODUCTION

In the collection of production data, the Dominion Bureau of Statistics makes a division between primary and secondary production. In the first-named class, there are separate sections for the collection of statistics on (a) **Agricultural Products**, (b) **Furs**, (c) **Fish**, (d) **Forest Products**, (e) **Mineral Products**.

In the second are included (a) **Manufacturing** and (b) **Construction**.

Manufacturing is subdivided into nine groups of industries, producing concerns being classified according to the principal component material of their major products. For example, manufactures of leather goods are classified under "Animal Products"; the pulp and paper industry under "Wood and Paper", etc. An outline of the scheme of classification in use for manufacturing industries is given below.

Manufactures of—

- (1) **Vegetable Products**, including—Coffee and Spices; Biscuits, Confectionery, Cocoa and Chocolate; Preserved and Canned Products; Pickles, Vinegar and Cider; Flour and Cereals; Bread and other Bakery Products; Macaroni and Vermicelli; Distilled and Brewed Liquors and Wines; Aerated Waters; Rubber Products; Starch and Glucose; Sugar; Tobacco Products; Linseed Oil and Oil Cake.
- (2) **Animal Products**, including—Fish and Fish Products; Dairy Factory Products; Meat and Meat Products; Leather and Leather Products; Furs and Fur Products.
- (3) **Textiles and Textile Products**, including—Cotton Textiles (Cloth, Yarn, Thread and Waste); Woolen Textiles (Cloth, Yarn, Blankets, Felt and Waste); Silk Products; Factory-Made Clothing; Carpets, Rugs and Mats; Cordage, Rope and Twine.
- (4) **Wood and Paper**, including—Pulp and Paper Mill Products; Paper Goods; Printing, Publishing and Lithographing; Saw and Planing Mill Products; Furniture; Carriages; Wagons and Sleighs; Wooden Containers; Woodenware; Turned Wood Products; and the Output of Similar Wood-Using Industries.
- (5) **Iron and Steel and Their Products**: Primary Iron and Steel (Pig Iron, Ferro-Alloys, Steel and Rolled Products); Castings and Forgings; Heating and Cooking Apparatus; Boilers, Tanks and Engines; Farm Implements; Machinery; Automobiles; Auto Parts; Bicycles; Aircraft; Shipbuilding; Railway Rolling Stock; Wire and Wire Goods; Sheet Metal Products; Hardware, Cutlery and Tools; Bridge Building and Structural Steel; Miscellaneous Iron and Steel Products.
- (6) **Manufactures of Non-Ferrous Metal Products**, including—Aluminium Products; Brass and Copper Products; White Metal Alloys; Jewellery and Silverware; Electrical Apparatus and Supplies; Non-Ferrous Smelting and Refining; Miscellaneous Non-Ferrous Metal Products.
- (7) **Manufactures of the Non-Metallic Minerals**, including—Asbestos Products; Cement; Cement Products; Coke and Gas; Glass (blown, cut, ornamental, etc.); Lime; Petroleum Products; Products from Domestic Clays; Products from Imported Clays; Salt; Sand-Lime Brick; Dressed Stone; Artificial Abrasives and Abrasive Products; Miscellaneous Non-Metallic Mineral Products, including (a) Artificial Graphite and Electrodes, (b) Gypsum Products, (c) Mica Products, (d) Miscellaneous Non-Metallic Mineral Products, n.e.s.
- (8) **Chemicals and Allied Products**, including—Coal Tar Distillation; Acids, Alkalies and Salts; Compressed Gases; Fertilizers; Medicinal and Pharmaceutical Preparations; Paints, Pigments and Varnishes; Soaps, Cleaning Preparations and Washing Compounds; Toilet Preparations; Inks; Adhesives; Polishes and Dressings; Hardwood Distillation; Miscellaneous Chemical Products, including (a) Boiler Compounds, (b) Cellulose Products, (c) Insecticides, (d) Sweeping Compounds; (e) Disinfectants, (f) Matches, (g) Dyes and Colours, (h) Explosives, Ammunition and Fireworks, (i) Chemical Products, n.e.s.
- (9) **Miscellaneous Products**, including—Brooms and Brushes; Musical Instruments, etc.; Mattresses and Springs; Sporting Goods; Buttons and Fasteners.

The statistics of manufactures are also classified according to the **use or purpose** of the end product as follows:—

- (1) **Food**, including—Breadstuffs; Fish; Nuts; Fruits and Vegetables; Meats; Milk Products; Oils and Fats; Sugar; Infusions; Miscellaneous.
- (2) **Drink and Tobacco**, including—Beverages, alcoholic; Beverages, non-alcoholic; Tobacco.
- (3) **Clothing**, including—Boots and Shoes; Fur Goods; Garments and Personal Furnishings; Gloves and Mitts; Hats and Caps; Knitted Goods; Waterproofs; Miscellaneous.
- (4) **Personal Utilities**, including—Jewellery and Time-Pieces; Recreational Supplies; Personal Utilities, n.e.s.
- (5) **House Furnishings**.
- (6) **Books and Stationery**.
- (7) **Vehicles and Vessels**.
- (8) **Producers' Materials**, including—Farm Materials; Manufacturers' Materials; Building Materials; General Materials.
- (9) **Industrial Equipment**, including—Farm Equipment; Manufacturing Equipment; Trading Equipment; Service Equipment; Light, Heat and Power Equipment; General Equipment.
- (10) **Miscellaneous**.

PREFACE

The first statistical report on the mineral production of Canada was issued by the Geological Survey in 1886. In 1907 the work of the Mines section of the Geological Survey was transferred to the Mines Branch of the then newly organized Department of Mines. In 1921 the work was again transferred to the Mining, Metallurgical and Chemical Branch of the Dominion Bureau of Statistics.

The present report contains final data on the production of Canada's mines, together with details of the capital employed in the mining industry, salaries and wages paid, the number of employees, the amount expended on fuel and power, and the power producing equipment installed.

Since 1928 it has been the practice to show historical tables of production for ten years only and to refer the reader to the annual report of 1928 for earlier data. This has not always been convenient for students and writers. In order to bring our historical tables up to date and for the sake of convenience, we are placing in this issue a special table on the production of all minerals and metals as far back as authentic Canadian records are available. This will be found on pages 15-27.

Tables of production by different countries of the world are included for the purpose of assisting those who may be making international studies of production and who may not have a good reference library readily at hand. These tables are taken from the annual statistical summary of the Mineral Industry of the British Empire and Foreign Countries, published by the Imperial Institute in London, and their use here is gratefully acknowledged.

The year under review was the greatest year on record in the mineral industry in Canada. Production reached an aggregate value of \$457,359,092 and output records were established for gold, copper, lead, zinc, nickel, platinum metals, natural gas, crude petroleum and several of the non-metallics. New gold mines were opened up and employment increased. Purchases of process supplies by the metal mines, smelters and refineries totalled \$99,957,066, and indicate to some degree the value of a prosperous primary industry to the country at large.

As in previous years, the Bureau co-operated with the Mines Departments of the provinces of Nova Scotia, New Brunswick, Quebec, Ontario, Manitoba, Saskatchewan and British Columbia, in the collection of these statistics. Forms are filled out in duplicate, thereby saving the operator extra work and resulting in uniform totals for the provincial and Dominion statistical bureaux.

The thanks of the Bureau are tendered to the mine and smelter operators for assistance given and information made available. Railway and other transportation companies as well as smelter operators outside of Canada have also furnished data, the receipt of which is gratefully acknowledged.

The report has been prepared under the direction of Mr. W. H. Losee, B.Sc., F.C.I.C., Chief of the Mining, Metallurgical and Chemical Branch, by Mr. R. J. McDowall, B.Sc., and Mr. B. R. Hayden, of the mineral division staff.

R. H. COATS,

Dominion Statistician.

DOMINION BUREAU OF STATISTICS,

OTTAWA, April 22, 1939.

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DOMINION BUREAU OF STATISTICS

R. H. COATS, LL.D., F.R.S.C., F.S.S. (Hon.), Dominion Statistician
W. H. LOSEE, B.Sc., Chief of the Mining, Metallurgical and Chemical Branch

ANNUAL REPORT

ON THE

MINERAL PRODUCTION OF CANADA

DURING THE CALENDAR YEAR 1937

CHAPTER ONE

Primary mineral production in Canada during the calendar year 1937 was valued at \$457,359,092, an increase of 26.4 per cent over the corresponding value of \$361,919,372 recorded for the preceding year. Production of mineral wealth in the Dominion during the year under review was the greatest ever recorded in the history of the Canadian mining industry. All time high records were established during 1937 in the output of gold, copper, lead, nickel, zinc, selenium, tellurium, platinum metals, asbestos, salt, quartz, nepheline-syenite, sodium sulphate, sulphur, natural gas, and crude petroleum.

In the metals group the distinct improvement over 1936 in base metal prices contributed greatly to the increase in the value of metal production from a total of \$259,425,194 in 1936 to \$334,165,243 in 1937. Also reflected in the expansion in metal output was the increased demand for war materials arising from the unsettled political condition existing in Europe and the Far East.

The intensive development and exploration programmes conducted during recent years by mining companies operating in both old and new auriferous areas were directly responsible for the continued increase in gold production in 1937. These widespread activities in exploitation of our natural resources are not only of ever growing importance in the opening up of our north-land but are providing a constantly expanding market for the diversified products of Canadian manufacturing plants. Indicative of the increasing purchasing power of the Canadian mining industry is the fact that in 1937 the purchases of equipment and consumable supplies, together with expenditures for freight and insurance, by Canadian gold mines alone, totalled \$40,625,357 compared with \$28,707,183 in 1935. In 1937 the corresponding total value of similar expenditures by the base metal mining, smelting and refining industries in the Dominion was \$59,331,709 compared with \$37,181,508 in 1935.

Of the total value of Canada's entire mineral output in 1937 the mining industry of Ontario contributed 50.3 per cent; British Columbia, 16.1 per cent, and Quebec, 14.2 per cent. In the Northwest Territories and in Northern Saskatchewan several promising gold bearing properties were under intensive investigation, the trend of which would indicate an early expansion in the gold output of the Prairie Provinces and Northwestern Canada.

Production of most of the industrial or non-metallic minerals was stimulated by the almost general improvement in trade conditions. Success encountered by operators in the Turner Valley oil field of Alberta resulted in an all time high Canadian production of crude petroleum; asbestos output surpassed all previous records; coal and natural gas production were both higher than in the preceding year; shipments of nepheline-syenite, a new mineral competitor of feldspar, were more than trebled in its second year of commercial production and an all time high in sulphur recovery, principally from waste smelter gases, was the direct result of expansion in the mining and smelting of non-ferrous ores.

The benefit directly derived in 1937 by the producers of primary structural materials of mineral origin, through a revival in construction, was apparent in an increase over 1936 of more than \$9,000,000 in the total sales value of these products; all major groups comprising the structural materials division of the mining industry and including clay products, lime, stone, sand and gravel, and cement, realized distinct gains in output during 1937.

Employment in the Mining Industry, in its entirety, realized almost continuous monthly increases throughout 1937, the index for the year being 153.2 compared with a base of 100 for 1926. The number of employees in all branches of the industry in 1937 totalled 105,414 compared with 60,804 in 1921, the first calendar year for which complete labour statistics pertaining to mining were systematically collected and recorded under the Statistics Act. Of the total employees reported in 1937 those engaged in the mining and smelting of metal bearing ores numbered 55,046 against a corresponding total of 12,133 in 1921. The great expansion in Canadian gold mining, in less than two decades, is emphasized by the fact that in 1937 this particular industry distributed \$48,219,318 in salaries and wages to 29,140 employees compared with but \$6,072,318 to 3,889 employees in 1921.

The first comprehensive statistical data relating to the production of mineral wealth in Canada were recorded in 1886 in which year the value of Canadian mineral production totalled \$10,221,255 or a per capita value of \$2.23. In 1937 the annual output of the mining industry had risen to \$457,359,092 with a per capita value of \$41.13 and in the 51 years of completely recorded production statistics, the cumulative value of Canadian mineral production has reached the impressive total of \$7,178,721,000, or a value equivalent to \$645.57 for every person living in the Dominion in 1937.

Table 1.—Mineral Production of Canada, by Provinces, 1937

—	Nova Scotia	New Brunswick	Quebec	Ontario	Manitoba	Saskatchewan	Alberta	British Columbia	North- west Territories	Yukon
METALLICS										
Antimony (a) lb.	48,163									
Arsenic (As ₂ O ₃) lb.	7,394									
Bismuth lb.				1,389,426						
Cadmium lb.				41,032						
Chromite ton				5,711						
Cobalt lb.				5,654						
Copper lb.					164,223	144,553		436,431		
Gold fine oz.					269,326	237,067		715,747		
Lead lb.			3,286	39,964						
Manganese ore ton				507,064						
Molybdenite (concentrates) ton				848,145						
Nickel lb.										
Palladium, Rhodium, Iridium, etc. fine oz.										
Platinum fine oz.										
Radium and uranium (products) lb.										
Selenium lb.			208,531	116,696	43,920	28,080				
Silver fine oz.	26,990		360,759	201,884	75,982	48,578				
Tellurium lb.	12,113		908,590	4,693,047	905,179	821,818				
Titanium ore ton			407,784	2,106,286	406,253	368,840				
Zinc lb.			26,439	6,651	5,124	3,276				
			45,739	11,506	8,865	5,667				
			4,229							
			26,432							
			8,566,927	120,011	36,221,314	32,750,910				
			419,951	5,883	1,775,569	1,605,449				
Total										
Metallics	1,030,324	817	38,615,105	204,909,799	13,937,378	7,505,242	1,612	64,320,462	60,788	3,783,716

(a) Contained in concentrates exported.

Table 1.—Mineral Production of Canada, by Provinces, 1937—Continued

—	Nova Scotia	New Brunswick	Quebec	Ontario	Manitoba	Saskatchewan	Alberta	British Columbia	North-west Territories	Yukon
NON-METALLICS										
FUELS										
Coal.....	ton	7,256,954	364,714		3,172	1,049,348	5,562,839	1,598,843		84
	\$	25,640,819	1,180,611		7,709	1,494,337	14,563,911	5,863,849		812
Natural M cu. ft			576,671	10,746,334	600	100,380	20,955,506		1,500	
Gas	\$		283,922	6,588,798	180	35,130	4,766,437		335	
Peat.....	ton			478						
	\$			2,676						
Petroleum... bbl.		18,089		165,205			2,749,085		11,371	
	\$	25,496		356,000			4,961,002		56,855	
Total Fuels \$		25,640,819	1,490,029	6,947,474	7,889	1,529,467	24,291,350	5,863,849	57,190	812
OTHER NON-METALLIC AND INDUSTRIAL MINERALS										
Asbestos....	ton		410,025	1						
	\$		14,505,541	250						
Bituminous sands	ton						35			
	\$						142			
Diatomite... ton	481			38				124		
	\$	15,392		1,868				1,346		
Feldspar.... ton			12,285	9,061						
	\$		105,612	72,610						
Fluorspar... ton				150						
	\$			2,550						
Graphite.... \$				125,343						
Grindstones (includes pulpstones, etc.).....	ton	37	288					87		
	\$	4,415	12,139					4,875		
Gypsum..... ton	926,796	36,906		53,780	13,941			15,764		
	\$	978,288	131,727	233,895	88,095			108,478		
Iron Oxides (Ochre) ton			5,617					580		
	\$		77,640					6,000		
Lithium minerals.....	\$				1,694					
Magnesitic-dolomite.....	\$		677,207							
Magnesium sulphate ton								727		
	\$							14,456		
Mica..... lb.			1,092,105	798,271						
	\$		124,594	9,137						
Mineral waters Imp. gal.			198,319	26,700						
	\$		19,697	889						
Nepheline-syenite.....	\$			121,481						
Phosphate... ton			100							
	\$		900							
Quartz..... ton	11,732		127,535	1,142,372		95,809				
	\$	14,078	448,327	633,073		33,533				
Salt..... ton	47,865			407,701	3,391					
	\$	216,401		1,539,599	43,465					
Silica brick... M	2,926			818						
	\$	121,146		59,980						
Soapstone (†) \$			40,513							
Sodium carbonate... ton								286		
	\$							2,574		
Sodium sulphate... ton						79,804	80			
	\$					617,548	480			
Sulphur (*) ton			28,534	14,009				88,370		
	\$		194,496	140,090				820,406		
Talc..... ton				12,457						
	\$			123,301						
Total Other Non-Metallics \$	1,349,720	143,866	16,194,527	3,064,066	133,254	651,081	622	958,135		

(*) Sulphur content of pyrites shipped and estimated sulphur contained in sulphuric acid and elemental sulphur made from waste smelter gases.

(†) Includes some talc.

Table 1.—Mineral Production of Canada, by Provinces, 1937—Continued

	Nova Scotia	New Brunswick	Quebec	Ontario	Manitoba	Saskatchewan	Alberta	British Columbia	North- west Territories	Yukon
CLAY PRODUCTS AND OTHER STRUCTURAL MATERIALS										
CLAY PRODUCTS										
Clay—										
Fireclay...ton	2,660	42				4,713		650		
\$	8,208	1,660				11,868		9,332		
Bentonite...ton					132			31		
\$					1,154			817		
Brick—										
Soft mud process—										
Face....M			600	9,015			61	228		
\$			7,527	157,160			1,385	9,472		
Common.M	171	1,882	1,784	9,149	5,234		1,691	3,725		
\$	1,800	26,868	17,539	120,731	77,868		20,390	51,338		
Stiff mud process (wire cut)—										
Face....M	639	798	13,043	21,904	299	54	109	764		
\$	14,307	17,688	250,737	416,048	7,553	1,561	2,177	25,544		
Common M	4,472	1,849	33,475	13,516		258	553	1,566		
\$	58,753	21,853	458,485	187,776		2,555	3,212	22,996		
Dry press—										
Face....M			1,695	9,277		59	1,570			
\$			40,283	177,837		1,677	13,745			
Common.M			3,292	3,272			7,572			
\$			51,025	48,220			53,417			
Fancy or ornamental brick....M				55						
\$				2,972						
Sewer brick.M				175						
\$				2,777						
Paving brick....M										
\$										
Firebrick...M						522	10	131		
\$						27,010	474	2,418		
Fireclay blocks and shapes...\$	753	800				63,106		115,343		
Structural tile—								10,772		
Hollow blocks...ton	4,471	589	20,016	32,864	638	775	2,841	2,332		
\$	40,898	4,586	169,632	262,988	5,432	7,553	20,903	21,851		
Roofing tile....No.				36,152				24,390		
\$				2,117				1,185		
Floor tile (quarries) Sq. ft.				70,329				2,862		
\$				11,708				461		
Drain tile...M	70	368	464	9,605	58		44	784		
\$	2,991	17,261	13,950	233,258	3,524		2,200	25,786		
Sewer pipe, copings, flue linings, etc...\$	279,136	355	43,415	338,895			85,490	42,919		
Pottery, glazed or unglazed...\$		32,805		54,581			135,245	9,578		
Other clay products...\$			560	16,777				2,115		
Total Clay Products...\$	406,846	123,876	1,053,153	2,033,845	95,531	115,330	338,638	349,640		
OTHER STRUCTURAL MATERIALS										
Cement....bri.			2,578,623	2,650,652	328,518		267,106	344,072		
\$			3,537,798	3,657,067	745,736		531,541	623,725		
Lime—										
Quicklime ton	17,289	11,630	118,040	268,304	18,252		10,224	22,799		
\$	145,737	90,067	778,216	1,874,405	143,040		89,209	131,709		
Hydrated ton	398	8,269	38,273	26,163	4,345		427	4,940		
lime...\$	4,378	60,295	130,900	278,239	72,125		4,269	22,328		
Sand and gravel...ton	2,992,429	1,136,013	9,476,000	8,832,526	1,380,957	822,447	711,966	1,648,963		
\$	1,457,266	715,652	2,637,495	3,613,854	551,464	470,343	312,687	733,935		
Stone.....ton	178,721	57,468	1,958,396	4,223,000	41,191		13,225	463,611		
\$	279,098	139,041	2,213,021	3,663,768	65,228		27,189	552,015		
Total Other Structural Materials...\$	1,886,479	1,005,055	9,297,430	13,087,333	1,577,593	470,343	964,895	2,063,712		
Grand Total...\$	30,314,188	2,763,643	65,160,215	230,042,517	15,751,645	10,271,463	25,597,117	73,555,798	117,978	3,784,528

Table 2.—Quantities and Values of Mineral Products from Canadian Sources, 1936 and 1937 ⁽¹⁾

		1936		1937	
		Quantity	Value	Quantity	Value
			\$		\$
METALLICS					
Antimony (a).....	lb.			48,163	7,394
Arsenic (As ₂ O ₃).....	lb.	1,365,606	42,491	1,389,426	41,032
Bismuth.....	lb.	364,165	360,523	5,711	5,654
Cadmium.....	lb.	785,916	699,465	745,207	1,222,140
Chromite.....	tons		13,578		43,250
Cobalt.....	lb.	887,591	804,676	507,064	848,145
Copper.....	lb.	421,027,732	39,514,101	530,028,615	68,917,215
Gold.....	fine oz.	3,748,028	77,478,612	4,096,213	84,676,238
Estimated exchange equalization paid for gold produced.....			53,814,809		58,650,258
Lead.....	lb.	383,180,909	14,993,869	411,999,484	21,053,173
Manganese ore.....	tons	221	1,596	85	817
Molbydenite ore.....	tons			8	147
Nickel.....	lb.	169,739,393	43,876,525	224,905,046	59,507,176
Palladium, Rhodium, Iridium, etc.....	fine oz.	103,671	2,483,075	119,829	3,179,782
Platinum.....	fine oz.	131,571	5,320,731	139,377	6,752,816
Radium and Uranium.....	(c)		(c)		(c)
Selenium.....	lb.	350,857	621,017	397,227	687,203
Silver.....	fine oz.	18,334,487	8,273,804	22,977,751	10,312,644
Tellurium.....	lb.	35,591	62,997	41,490	71,777
Titanium ore.....	tons	2,566	18,318	4,229	26,432
Zinc.....	lb.	333,182,736	11,045,007	370,337,589	18,153,949
Total.....			259,425,194		334,165,243
NON-METALLICS—FUEL					
Coal.....	tons	15,229,182	45,791,934	15,835,954	48,752,048
Natural gas.....	M cu. ft.	28,113,348	10,762,243	32,380,991	11,674,802
Peat.....	tons	1,341	7,376	478	2,676
Petroleum, crude.....	brls.	1,500,374	3,421,767	2,943,750	5,399,353
Total.....			59,983,320		65,828,879
OTHER NON-METALLICS					
Asbestos.....	tons	301,287	9,958,183	410,026	14,505,791
Barytes.....	tons				
Bituminous sands.....	tons			35	142
Diatomite.....	tons	615	13,650	643	18,606
Feldspar.....	tons	17,846	154,475	21,346	178,222
Fluorspar.....	tons	75	900	150	2,550
Graphite.....	tons		88,812		125,343
Grindstones†.....	tons	569	24,724	412	21,429
Gypsum.....	tons	833,822	1,278,971	1,047,187	1,540,483
Iron oxides (ochres).....	tons	5,854	69,630	6,197	83,640
Lithium minerals.....	\$				1,694
Magnesitic dolomite.....			768,742		677,207
Magnesium sulphate.....	tons	654	13,712	727	14,456
Mica.....	tons	801	74,556	945	133,731
Mineral waters.....	imp. gal.	154,286	18,516	225,019	20,586
Nepheline-syenite.....			37,426		121,481
Phosphate.....	tons	525	4,927	100	900
Quartz (b).....	tons	1,046,649	597,781	1,377,448	1,129,011
Salt.....	tons	391,316	1,773,144	458,957	1,799,465
Silica brick.....	M	2,393	97,285	3,744	181,126
Soapstone.....			32,770		40,513
Sodium carbonate.....	tons	192	1,677	286	2,574
Sodium sulphate.....	tons	75,598	552,681	79,884	618,028
Sulphur*.....	tons	122,132	1,033,055	130,913	1,154,992
Talc.....	tons	14,508	144,500	12,457	123,301
Total.....			16,740,117		22,495,271
CLAY PRODUCTS AND OTHER STRUCTURAL MATERIALS					
CLAY PRODUCTS—Total.....			3,471,027		4,516,859
OTHER STRUCTURAL MATERIALS					
Cement.....	brls.	4,508,718	6,908,192	6,168,971	9,095,867
Lime (d).....	tons	468,401	3,335,970	549,363	3,824,917
Sand and gravel.....	tons	22,124,160	6,921,399	27,001,301	10,492,696
Stone—					
Granite.....	tons	941,743	1,319,313	1,135,099	1,827,433
Limestone.....	tons	3,731,548	3,143,872	5,542,806	4,673,942
Marble.....	tons	22,866	169,698	21,642	88,595
Sandstone.....	tons	285,508	495,856	235,165	343,871
Slate.....	tons	1,247	5,414	900	5,519
Total.....			22,299,714		30,352,840
Grand Total (Canadian Funds).....			361,919,372		457,359,092

(1) Unless otherwise noted, all total values of mineral production from 1931 to 1937, inclusive, contain estimated exchange equalization on gold produced.

† Includes grindstones, pulpstones and scythestones.

* Sulphur content of pyrites shipped and estimated sulphur salvaged from smelter gases.

(a) Contained in ores exported from Nova Scotia.

(b) Includes low grade silica fluxing sand.

(c) Data not published.

(d) Includes lime used for chemical purposes.

Table 3.—Mineral Production of Canada for the Period January 1 to June 30, 1937 and 1938

		1937		1938	
		January 1 to June 30		January 1 to June 30	
		Quantity	Value	Quantity	Value
			\$		\$
METALLICS					
Arsenic (As ₂ O ₃).....	lb.	796,229	24,492	645,615	19,525
Bismuth.....	lb.				
Cadmium.....	lb.	373,014	559,522	362,742	373,624
Chromite.....	\$		3,286		288,662
Cobalt.....	lb.	240,862	379,195	219,515	27,765,202
Copper.....	lb.	243,919,406	34,377,884	292,396,871	45,877,187
Gold.....	fine oz.	1,966,858	40,658,562	2,219,309	32,087,138
Estimated exchange equalization on gold produced.....	\$		28,161,799		6,956,380
Lead.....	lb.	199,204,362	11,667,399	204,961,121	28,559,696
Nickel.....	lb.	111,610,392	29,218,283	109,286,472	1,709,300
Palladium, Rhodium, Iridium, etc.....	fine oz.	57,642	1,433,407	58,211	2,269,528
Platinum.....	fine oz.	68,244	3,685,858	71,866	
Radium and Uranium products.....		Data not available for publication			
Selenium.....	lb.	165,994	285,509	213,235	373,161
Silver.....	fine oz.	9,605,095	4,322,292	10,532,011	4,622,605
Tellurium.....	lb.	46,033	79,177	39,116	68,453
Titanium ore.....	tons	833	5,623		
Zinc.....	lb.	170,535,713	9,348,768	197,951,223	6,154,303
Total.....	\$		164,211,056		157,124,764
NON-METALLICS					
Fuels					
Coal.....	tons	6,996,343	21,326,043	6,907,209	21,088,912
Natural gas.....	M cu. ft.	15,536,287	5,983,142	17,985,532	6,469,546
Peat.....	tons				
Petroleum, crude.....	brl.	1,062,046	2,384,760	2,919,425	5,285,332
Total.....	\$		29,693,945		32,843,790
Other Non-Metallics					
Asbestos.....	tons	197,800	6,678,083	132,291	5,757,453
Diatomite.....	tons	197	4,925	205	5,712
Feldspar.....	tons	8,425	77,216	5,648	52,238
Fluorspar.....	tons	43	752	50	875
Graphite.....	\$		63,070		22,616
Gypsum.....	tons	377,198	648,250	330,607	565,485
Iron oxides (ochre).....	tons	2,735	42,580	1,350	27,105
Lithium ore.....	\$		1,202		
Magnesium sulphate.....	tons	479	9,529		261,905
Magnetite-dolomite.....	\$		340,907		41,466
Mica.....	lb.	1,327,480	65,737	405,901	6,442
Mineral waters.....	imp. gal.	45,169	7,142	49,391	73,318
Nepheline syenite.....	\$		51,087		1,826
Phosphate.....	tons			206	420,988
Quartz.....	tons	628,807	495,411	710,254	819,109
Salt.....	tons	208,814	842,865	197,240	25,923
Silica brick.....	M	1,000	53,299	305	7,835
Soapstone.....	\$		11,516		211,375
Sodium sulphate.....	tons	37,817	264,784	28,460	577,011
Sulphur (x).....	tons	62,055	544,425	58,930	46,711
Talc.....	tons	6,241	60,485	4,687	
Total.....	\$		10,263,265		8,925,393
STRUCTURAL MATERIALS					
Clay products.....	\$		1,596,548		1,564,088
Cement.....	brl.	2,090,006	3,200,000	2,167,461	3,215,000
Lime.....	tons	269,314	1,918,000	224,763	1,565,000
Stone and sand and gravel (a).....	\$		4,500,000		4,400,000
Total (a).....	\$		11,214,548		10,744,088
Grand Total.....	\$		215,382,814		209,638,635

(x) Sulphur content of pyrites shipped and estimated sulphur contained in sulphuric acid and other products made from waste smelter gases.

(a) Estimated.

FOREIGN EXCHANGE, 1937

(Internal Trade Branch)

Apart from a marked decline in the French franc, there were no major adjustments in foreign exchange parities during 1937. Attempts to maintain the franc within limits set at the time of formal devaluation in October, 1936, were unsuccessful, and recurrent periods of pressure culminated in a financial moratorium in the closing days of June. The new level of 3·875 cents also proved too high, although more than half a cent below the 1936 devaluation minimum. Further breaks early in October carried franc rates down to 3·29 cents which proved to be the low for the year. They later recovered to 3·40 cents and were stabilized near that level during November and December. Widening discounts on forward positions pointed to renewed pressure as the year ended. The unstable condition of short-term capital markets was reflected in the erratic behaviour of London gold bullion prices. Fears of a reduction in the United States official price of gold led to huge offerings on the London market in May and early June. British authorities finally intervened to establish a London price of \$34.72 per ounce. This restored confidence and quotations moved up again to the vicinity of the London-New York parity, thus effectively checking a heavy movement of gold to the United States. Later, after drastic declines in basic commodity price levels, gold hoarding re-appeared and bullion prices at London moved above the London-New York parity, leading to a small outflow of gold from the United States to Europe early in November. Montreal sterling rates reached a 1937 peak of \$5.02 at this time, and then after a moderate reaction, held close to \$5.00 for the balance of the year. Prior to November, sterling monthly averages varied between \$4·8824 (March) and \$4·9826 (August). New York funds at Montreal were quoted within small fractional amounts of par throughout the year. A persistent inflow of funds to the Netherlands caused the Netherlands Bank to reduce the official price of gold twice during the year in an attempt to discourage this movement. Montreal monthly average rates on the florin advanced from 54·77 cents in January to 55·62 cents in December. The Belgian belga was subject to intermittent periods of pressure but its basic position remained unshaken, and the December average rate of 16·99 cents was fractionally above levels of a year earlier. Scandinavian currencies maintained their positions with respect to sterling, registering moderate gains in the latter half of 1937. Trading in the Spanish peseta was resumed in August, and gradual declines reduced the December average to 6·19 cents as compared with 6·37 cents in August. Japan established a system of import control at the beginning of 1937, and supported the yen by repeated shipments of gold during the year. The yen-sterling parity remained practically unchanged. Latin-American currencies felt the impact of falling commodity markets in the final quarter through their influence upon export trade values. The Argentine peso held comparatively firm, in line with sterling, but other units, including the Brazilian milreis, suffered considerable declines. Brazil removed all exchange restrictions for a brief period in November and December, but re-imposed others before the year ended.

Table 4.—Exchange Quotations at Montreal, 1937

	United States Dollar	London Sterling	France Franc	Italy Lira	Australia (Pound)	Germany Reichs- mark	Japan Yen	Union of S. Africa (Pound)
	\$	\$	\$	\$	\$	\$	\$	\$
January.....	1·0003	4·9092	·0467	·0526	3·9273	·4024	·2855	4·9031
February.....	1·0002	4·8953	·0466	·0526	3·9162	·4023	·2854	4·8892
March.....	·9995	4·8824	·0460	·0526	3·9060	·4019	·2848	4·8763
April.....	·9987	4·9095	·0449	·0525	3·9276	·4015	·2860	4·9033
May.....	·9984	4·9313	·0447	·0525	3·9451	·4011	·2874	4·9251
June.....	1·0005	4·9380	·0444	·0526	3·9504	·4009	·2877	4·9252
July.....	1·0013	4·9736	·0381	·0527	3·9789	·4025	·2892	4·9674
August.....	1·0001	4·9826	·0375	·0526	3·9861	·4022	·2903	4·9771
September.....	1·0000	4·9532	·0352	·0526	3·9629	·4013	·2887	4·9470
October.....	·9997	4·9535	·0335	·0526	3·9628	·4015	·2884	4·9473
November.....	·9992	4·9908	·0339	·0526	3·9926	·4033	·2907	4·9845
December.....	1·0004	4·9985	·0340	·0526	3·9988	·4032	·2910	4·9922

NOTE.—The noon rates in Canadian Funds upon which these averages are based, have been supplied by the Bank of Canada.

Prices (Non-Ferrous Metals)

(Internal Trade Branch)

Copper.—Noteworthy changes occurred in copper prices in 1937. These were well illustrated by the behaviour of standard cash grades at London. From an opening of £49 per ton, quotations rose to £78 by March 11, dropped back to £36 3 3/4 s. by November 23 and closed at £39 7½ s. per ton. Following the consecutive upward revisions of quota allotments in 1936, production restrictions were removed entirely early in 1937. Owing to keen speculative buying, prices continued upward, however, to reach the year's high in March. Subsequently, as the slackening in demand by the United States increased, prices moved downward and restrictive measures were again imposed on December 1. World consumption was estimated at 2,230,000 long tons in 1937 as compared with 1,900,000 in 1936. World stocks at 425,000 tons, at the end of the year, were 110,000 tons greater than at the close of 1936.

Lead.—Stimulated by reports of a potential scarcity of supplies, lead markets advanced to new peak levels in March, 1937, which proved to be the highest for the year. Domestic lead, carlots, f.o.b. Montreal, rose to \$7.69 or \$1.02 per 100 pounds above the January figure. As the shortage attained only minor proportions, markets reacted with the decline gaining momentum in the latter half of the year when demand from both the United States and the United Kingdom decreased. By December, Montreal quotations had fallen to \$4.40 but the yearly average was \$5.80 compared with \$4.64 per 100 pounds in 1936.

Zinc.—Zinc prices also reached the year's high in March. Montreal quotations for domestic metal rose \$2.44 to \$7.80 per 100 pounds between January and March but receded as speculative interest waned and by December prices had fallen to \$4.30 per 100 pounds. The year's average of \$5.59 was \$1.44 per 100 pounds higher than in 1936. New world records of 1,640,000 long tons for production and 1,615,000 long tons for consumption were established in 1937.

Silver.—Fluctuations in silver were narrow as indicated by a 2 cent spread between the New York high and low in 1937 compared with a 4 cent range in 1936. Highs for the year occurred at New York and London on April 6 and, except for a sharp recession in August, quotations remained fairly stable from then until December. Markets became more unsettled as the expiration of the United States government buying policy approached, and silver at London reached the lowest level for the year at 18 3/16d. on December 28. Fine silver at New York rose from 44.94 cents in January to 45.4 cents per ounce in April but fell to 44.9 cents in May. Prices remained close to 44.8 cents per ounce for the balance of the year. A 1937 average of 44.9 cents was only 1/10 of a cent below the 1936 quotation. (All prices are in Canadian funds.)

Table 5.—Metal Prices, 1933-1937

Metal	Market	Unit	1933	1934	1935	1936	1937
			\$	\$	\$	\$	\$
Antimony (ordinaries).....	New York.....	Pound....	0-06528	0-08901	0-13616	0-12240	0-15355
Arsenic, white (nominal).....	New York.....	Pound....	0-04	0-04	0-035	0-035	0-03
Cobalt (nominal).....	New York.....	Pound....	2-50	2-50	2-50	2-50	2-31
Cobalt Oxide (nominal).....	New York.....	Pound....	1-35	1-35	1-37	1-38	1-54
	New York.....	Pound....	0-07025	0-08428	0-08649	0-09474	0-13167
Copper.....	Montreal.....	Pound....	0-08684	0-0822	0-08488	0-10070	0-13469
	London.....	Long ton..	36-359	33-319	35-430	42-650	59-339
Gold (in Canadian funds).....		Fine oz....	28-60	34-50	35-19	35-03	34-99
	New York.....	Pound....	0-03869	0-03860	0-04065	0-04710	0-06009
Lead.....	Montreal.....	Pound....	0-03705	0-04488	0-03925	0-04642	0-05799
	London.....	Long ton..	11-670	10-935	14-238	17-599	23-326
Nickel.....	New York.....	Pound....	0-35	0-35	0-35	0-35	0-35
Platinum.....	London.....	Fine oz....	*7-630	*7-75	*7-325	*8-138	*9-811
Silver.....	New York.....	Fine oz....	0-34727	0-47973	0-64273	0-45087	0-44881
Tin.....	New York.....	Pound....	0-39110	0-52191	0-50420	0-46441	0-54337
	St. Louis.....	Pound....	0-04029	0-04158	0-04328	0-04901	0-06519
Zinc.....	Montreal.....	Pound....	0-04488	0-04059	0-03992	0-04153	0-05593
	London.....	Long ton..	15-666	13-657	14-082	14-920	22-258

NOTE.—All prices in dollars per unit excepting London copper, lead and zinc prices which are quoted in pounds sterling per long ton.

* Prices for platinum are quoted in pounds sterling per fine ounce.

Table 6.—Metal Prices by Months, 1936 and 1937

Month	Copper (Electrolytic)				Pig Lead					
	New York (In cents per pound)		London (In £ sterling per long ton)		Montreal (In cents per pound)		New York (In cents per pound)		London (In £ sterling per long ton)	
	1936	1937	1936	1937	1936	1937	1936	1937	1936	1937
	1936	1937	1936	1937	1936	1937	1936	1937	1936	1937
January.....	9.025	12.415	38.788	56.497	4.362	6.670	4.500	6.000	15.397	27.272
February.....	9.025	13.427	39.463	64.013	4.516	6.793	4.515	6.239	16.022	28.319
March.....	9.025	15.775	40.227	76.167	4.614	7.690	4.600	7.190	16.608	33.027
April.....	9.169	15.121	41.131	66.614	4.368	6.248	4.600	6.175	16.097	26.014
May.....	9.275	13.775	40.839	63.684	4.130	5.843	4.600	6.000	15.530	24.000
June.....	9.275	13.775	40.357	61.409	4.093	5.632	4.600	6.000	15.170	22.878
July.....	9.352	13.775	41.228	62.807	4.213	5.882	4.600	6.000	15.856	23.032
August.....	9.525	13.775	42.375	63.595	4.412	5.705	4.600	6.452	16.772	22.606
September.....	9.525	13.530	43.267	58.966	4.695	5.817	4.600	6.400	18.009	20.990
October.....	9.563	11.838	45.295	50.619	4.676	4.825	4.631	5.740	18.446	18.259
November.....	10.161	10.797	48.467	44.023	5.384	4.676	5.114	5.033	21.723	16.706
December.....	10.763	10.006	50.364	43.886	6.246	4.402	5.554	4.875	25.560	15.905
Average.....	9.474	13.167	42.650	59.339	4.642	5.799	4.710	6.009	17.599	23.326

Transposed into Canadian funds the average price of copper, based on the London market, was 9.47695 cents per pound in 1936 and 13.078 cents in 1937 the average price of lead, based on the same market, was 3.91277 cents per pound in 1936 and 5.110 cents in 1937.

Metal Prices by Months, 1936 and 1937

Month	Silver				Zinc					
	New York (In cents per oz. .999 fine)		London (In pence per oz. .925 fine)		Montreal (In cents per pound)		St. Louis (In cents per pound)		London (In £ sterling per long ton)	
	1936	1937	1936	1937	1936	1937	1936	1937	1936	1937
	1936	1937	1936	1937	1936	1937	1936	1937	1936	1937
January.....	47.250	44.913	20.250	20.734	4.221	5.36	4.848	5.847	14.488	21.153
February.....	44.750	44.750	19.796	20.083	4.400	6.196	4.859	6.465	15.125	25.122
March.....	44.750	45.130	19.663	20.677	4.548	7.779	4.900	7.381	15.983	33.188
April.....	44.892	45.460	20.245	20.740	4.235	6.327	4.900	7.010	15.181	26.216
May.....	44.809	45.025	20.248	20.346	3.980	5.688	4.900	6.750	14.536	23.092
June.....	44.750	44.818	19.770	20.022	3.886	5.334	4.880	6.750	13.896	21.409
July.....	44.750	44.750	19.590	19.986	3.796	5.579	4.783	6.923	13.579	22.568
August.....	44.750	44.750	19.490	19.848	3.807	5.993	4.800	7.192	13.523	24.140
September.....	44.750	44.750	19.579	19.889	3.891	5.438	4.850	7.190	13.906	21.406
October.....	44.750	44.750	19.977	19.942	3.914	4.750	4.850	6.085	14.554	17.722
November.....	45.431	44.750	21.050	19.707	4.388	4.371	4.974	5.630	16.301	15.808
December.....	45.352	44.750	21.238	18.835	4.768	4.298	5.273	5.010	17.957	15.274
Average.....	45.087	44.883	20.075	20.067	4.153	5.593	4.901	6.519	14.920	22.558

The average price of silver in Canadian funds based on the New York market in 1936 was 45.12654 cents per fine ounce and in 1937 it was 44.881 cents.

The average price of zinc in Canadian funds based on the London market in 1936 was 3.31501 cents per pound and in 1937 it was 4.902 cents.

Table 7.—Annual Values of the Mineral Production of Canada since 1886

Year	Value of production	Value per capita	Year	Value of production	Value per capita
1886.....	\$ 10,221,255	\$ 2.23	1913.....	\$ 145,634,812	\$ 19.35
1887.....	10,321,331	2.23	1914.....	128,863,075	16.75
1888.....	12,518,894	2.67	1915.....	137,109,171	17.44
1889.....	14,013,113	2.96	1916.....	177,201,534	22.05
1890.....	16,763,353	3.50	1917.....	189,646,821	23.18
1891.....	18,976,616	3.92	1918.....	211,301,897	25.37
1892.....	16,623,415	3.39	1919.....	176,686,390	20.84
1893.....	20,035,082	4.04	1920.....	227,859,665	26.40
1894.....	19,931,158	3.98	1921.....	171,923,342	19.56
1895.....	20,505,917	4.05	1922.....	184,297,242	20.55
1896.....	22,474,256	4.38	1923.....	214,079,331	23.41
1897.....	28,485,023	5.49	1924.....	209,583,406	22.71
1898.....	38,412,431	7.32	1925.....	226,583,333	24.19
1899.....	49,234,005	9.27	1926.....	240,437,123	25.61
1900.....	64,420,877	12.04	1927.....	247,356,695	25.67
1901.....	65,797,911	12.16	1928.....	274,898,487	27.96
1902.....	63,231,836	11.36	1929.....	310,850,246	31.00
1903.....	61,740,513	10.83	1930.....	279,873,578	27.42
1904.....	60,082,771	10.27	1931.....	230,434,726	22.21
1905.....	69,078,999	11.49	1932.....	191,228,225	18.20
1906.....	79,286,697	12.81	1933.....	221,495,253	20.74
1907.....	86,865,202	13.75	1934.....	278,161,590	25.67
1908.....	85,557,101	13.16	1935.....	312,344,457	28.56
1909.....	91,831,441	13.70	1936.....	361,919,372	32.82
1910.....	106,823,623	14.93	1937.....	457,359,092	41.13
1911.....	103,220,994	14.32			
1912.....	135,048,296	18.33			
			Grand Total.....	7,178,721,973	*645.57

* Based on population in 1937.

Table 8.—Annual Values of the Mineral Production of Canada, by Classes, since 1908

Year	Metallics	Non-Metallics		Total	Year	Metallics	Non-Metallics		Total
		Fuels and other non-metallics	Structural materials and clay products				Fuels and other non-metallics	Structural materials and clay products	
	\$	\$	\$	\$		\$	\$	\$	\$
1908...	41,774,362	32,142,784	11,339,955	(a) 85,557,101	1923...	84,391,218	91,936,732	37,751,381	214,079,331
1909...	44,156,841	31,141,251	16,533,349	91,831,441	1924...	102,406,528	71,796,009	35,380,869	209,583,406
1910...	49,438,873	37,757,158	19,627,592	106,823,623	1925...	117,082,298	71,851,801	37,649,234	226,583,333
1911...	46,105,423	34,405,960	22,709,611	103,220,994	1926...	115,237,581	85,240,144	39,959,399	240,437,123
1912...	61,172,753	45,080,674	28,794,869	135,048,296	1927...	113,561,030	88,986,246	44,809,418	247,356,695
1913...	66,361,351	48,463,709	30,809,752	145,634,812	1928...	132,012,454	93,239,852	49,737,181	274,989,487
1914...	59,386,619	43,467,229	26,009,227	128,863,075	1929...	154,454,056	97,861,356	58,534,834	310,850,246
1915...	75,814,841	43,373,571	17,920,759	137,109,171	1930...	142,743,764	83,402,349	53,727,465	279,873,578
1916...	106,319,365	53,414,983	17,467,186	177,201,534	1931...	120,930,147	65,346,284	44,158,295	230,434,726
1917...	106,455,147	63,354,363	19,837,311	189,646,821	1932...	112,041,763	56,788,179	22,398,283	191,228,225
1918...	114,549,152	77,621,946	19,130,799	211,301,897	1933...	147,015,933	57,782,973	16,696,687	221,495,253
1919...	73,262,793	76,002,087	27,421,510	176,686,390	1934...	194,110,968	64,763,861	19,286,761	278,161,590
1920...	77,939,630	108,027,947	41,892,088	227,859,665	1935...	221,800,849	67,328,208	23,215,400	312,344,457
1921...	49,343,232	87,842,682	34,737,428	171,923,342	1936...	259,425,194	76,723,437	25,770,741	361,919,372
1922...	61,785,707	82,976,794	39,534,741	184,297,242	1937...	334,165,243	88,324,150	34,869,699	457,359,092

(a) Total includes \$300,000 allowed for products not reported.

Table 9.—Values of the Mineral Production of Canada, by Provinces, since 1899

Year	Nova Scotia	New Brunswick	Quebec	Ontario	Manitoba	Saskatchewan	Alberta	British Columbia	Yukon*
	\$	\$	\$	\$	\$	\$	\$	\$	\$
1899...	6,817,274	420,227	2,585,635	9,819,557		17,108,707		12,482,605	Included with
1900...	9,298,479	439,060	3,292,383	11,258,099		23,452,330		16,680,526	Mani-
1901...	7,770,159	467,985	3,759,984	13,970,010		19,297,940		20,531,833	toba,
1902...	10,686,549	607,129	3,743,636	14,619,091		16,127,400		17,443,031	Saskat-
1903...	11,431,914	580,495	3,585,938	14,160,033		14,082,986		17,899,147	chewan
1904...	11,212,746	559,913	3,688,482	12,582,843		12,713,613		19,325,174	and
1905...	11,507,047	559,035	4,405,975	18,833,292		11,387,642		22,386,008	Alberta
1906...	12,894,303	646,328	5,242,152	25,111,682		10,092,726		25,299,600	
1907...	14,532,040	664,467	6,205,553	30,381,638	898,775	533,251	4,657,524	25,656,056	3,335,898
1908...	14,487,108	579,816	6,372,949	30,623,812	584,374	413,212	5,122,505	23,704,035	3,669,290
1909...	12,504,810	657,035	7,086,265	37,374,577	1,193,377	456,246	6,047,447	22,479,006	4,032,678
1910...	14,195,730	581,942	8,270,136	43,538,078	1,500,359	498,122	8,996,210	24,478,572	4,764,474
1911...	15,409,397	612,830	9,304,717	42,796,162	1,791,772	636,706	6,662,673	21,299,305	4,707,432
1912...	18,922,286	771,004	11,656,998	51,985,876	2,463,074	1,165,642	12,073,589	30,076,635	5,933,242
1913...	19,376,183	1,102,613	13,475,534	59,167,749	2,214,496	881,142	15,054,406	28,086,312	6,276,737
1914...	17,584,639	1,014,570	11,836,929	53,034,677	2,413,489	712,313	12,684,234	24,164,039	5,418,185
1915...	18,058,342	903,467	11,619,275	61,071,287	1,318,387	451,933	9,909,347	28,689,425	5,057,708
1916...	20,042,262	1,118,187	14,406,598	60,461,323	1,823,576	590,473	13,297,543	39,969,962	5,491,610
1917...	21,104,542	1,435,024	17,400,077	69,066,600	2,628,264	860,651	16,527,535	36,141,926	4,482,202
1918...	22,317,108	2,144,017	19,605,347	64,694,093	3,120,600	1,019,781	23,109,987	42,935,333	2,355,631
1919...	23,445,215	1,770,945	21,267,947	67,917,998	2,868,378	1,521,964	21,087,582	34,865,427	1,940,934
1920...	34,130,017	2,491,787	28,886,214	81,715,808	4,223,461	1,837,468	33,586,456	39,411,728	1,576,726
1921...	28,912,111	1,901,505	15,157,094	57,356,651	1,934,117	1,114,220	30,562,229	33,230,460	1,754,955
1922...	25,923,499	2,263,692	17,647,939	65,866,029	2,258,942	1,255,407	27,872,136	39,423,962	1,785,573
1923...	29,648,893	2,462,457	20,308,763	80,325,851	1,768,037	1,047,583	31,287,536	43,757,388	2,972,823
1924...	28,920,352	1,969,260	19,130,524	86,398,656	1,534,249	1,128,100	22,344,940	52,298,533	952,812
1925...	17,625,612	1,743,858	24,284,527	87,980,436	2,276,759	1,076,392	25,318,866	64,485,242	1,791,641
1926...	28,873,792	1,811,104	23,956,193	84,702,296	3,073,528	1,193,394	26,977,027	65,622,972	2,226,813
1927...	30,111,221	2,148,535	23,970,143	89,042,962	2,888,912	1,455,225	29,309,223	60,801,170	1,789,044
1928...	30,524,392	2,198,919	37,037,420	99,584,718	4,186,853	1,719,461	32,531,416	64,496,351	2,709,957
1929...	39,004,453	2,439,072	46,358,285	117,662,505	5,423,825	2,253,506	34,739,986	68,162,878	2,905,736
1930...	27,019,367	2,383,571	41,215,220	113,530,976	5,453,182	2,368,612	30,427,742	54,953,320	2,521,588
1931...	21,081,157	2,176,910	35,964,337	97,975,815	10,057,808	1,931,880	23,580,901	35,480,701	2,184,917
1932...	16,201,279	2,223,505	25,638,466	85,910,030	9,058,365	1,681,728	21,174,061	27,326,173	2,014,618
1933...	16,966,183	2,107,682	28,141,482	110,205,021	9,026,951	2,477,425	19,702,953	30,794,504	2,073,052
1934...	23,310,729	2,156,151	31,269,945	145,565,871	9,776,934	2,977,061	20,228,851	41,200,865	1,669,083
1935...	23,183,128	2,821,027	39,124,696	158,934,269	12,052,417	3,316,943	22,289,681	48,692,050	1,430,246
1936...	26,672,278	2,887,891	49,736,919	184,532,892	11,315,527	6,970,397	33,305,726	54,407,036	2,390,706
1937...	30,314,188	2,763,643	65,160,215	230,042,517	15,751,645	10,271,463	25,597,117	73,555,798	3,902,506

* Includes a relatively small production from the Northwest Territories since 1932 (\$117,978 in 1937).

Table 10. Percentage of the Total Value of the Mineral Production of Canada, by Provinces, 1931-1937

Province	1931	1932	1933	1934	1935	1936	1937
Nova Scotia...	9-24	8-9	7-7	8-4	7-4	7-4	6-6
New Brunswick...	0-96	1-2	0-9	0-8	0-9	0-7	0-6
Quebec...	15-65	13-4	12-7	11-2	12-5	13-8	14-2
Ontario...	42-15	43-5	49-8	52-3	50-9	51-0	50-3
Manitoba...	4-37	4-8	4-1	3-5	3-9	3-1	3-4
Saskatchewan...	0-85	0-9	1-1	1-1	1-2	1-9	2-3
Alberta...	10-34	11-6	8-9	7-3	7-1	6-4	5-6
British Columbia...	15-50	14-7	13-9	14-8	15-6	15-0	16-1
*Yukon...	0-94	1-0	0-9	0-6	0-5	0-7	0-9
Canada...	100-00	100-00	100-00	100-00	100-00	100-00	100-00

* Includes small production from the Northwest Territories since 1932.

Table 11.—Historical Summary of Canada's Mineral Production

Year	Gold*		Silver		Copper		Lead		Zinc†	
	fine oz.	\$	fine oz.	\$	pounds	\$	pounds	\$	pounds	\$
1858..	34,104	705,000								
1859..	78,129	1,615,072								
1860..	107,806	2,228,543								
1861..	128,973	2,666,118								
1862..	135,391	2,798,774								
1863..	202,498	4,186,011								
1864..	199,605	4,126,199								
1865..	192,898	3,987,562								
1866..	152,555	3,153,597								
1867..	145,775	3,013,431								
1868..	134,169	2,773,527								
1869..	102,720	2,123,405								
1870..	83,415	1,724,348								
1871..	105,187	2,174,412								
1872..	90,283	1,866,321								
1873..	74,346	1,536,871								
1874..	97,856	2,022,862								
1875..	130,300	2,693,533								
1876..	97,729	2,020,233								
1877..	94,304	1,949,444								
1878..	74,420	1,538,394								
1879..	76,547	1,582,358								
1880..	63,121	1,304,824								
1881..	63,524	1,313,153								
1882..	60,288	1,246,263								
1883..	53,853	1,113,246								
1884..	51,202	1,058,439								
1885..	55,575	1,148,829								
1886..	70,782	1,463,196			3,505,000	385,550				
1887..	57,460	1,187,804	355,083	347,271	3,260,424	366,798	204,800	9,216		
1888..	53,145	1,098,610	437,232	410,998	5,562,864	927,107	674,500	29,812		
1889..	62,653	1,295,159	383,318	358,785	6,809,752	936,341	165,100	6,488		
1890..	55,620	1,149,776	400,687	419,118	6,013,671	947,153	105,000	4,704		
1891..	45,018	930,614	414,523	409,549	9,529,401	1,226,703	88,665	3,857		
1892..	43,905	907,601	310,651	272,130	7,087,275	818,580	808,420	33,064		
1893..	47,243	976,603	330,128	8,109,856	871,809	836,228	2,135,023	79,636		
1894..	54,600	1,128,688	847,697	534,049	7,708,789	736,960	5,703,222	187,636		
1895..	100,798	2,083,674	1,578,275	1,030,299	7,771,639	836,228	16,461,794	531,716		
1896..	133,262	2,754,774	3,205,343	2,149,503	9,933,012	1,021,960	24,199,977	721,159		
1897..	291,557	6,027,016	5,558,446	3,323,395	13,300,802	1,501,660	39,018,219	1,396,853		
1898..	666,386	13,775,420	4,452,333	2,593,929	17,747,136	2,134,980	31,915,319	1,206,399	788,000	36,011
1899..	1,028,529	21,261,554	3,411,644	2,032,658	15,078,475	2,655,319	21,862,436	977,250	814,000	46,805
1900..	1,350,057	27,908,153	4,468,225	2,740,362	18,937,138	3,065,922	63,169,821	2,760,521	212,800	9,342
1901..	1,167,216	24,128,503	5,539,192	3,265,354	37,827,019	6,096,581	51,900,958	2,249,387		
1902..	1,032,161	21,336,667	4,291,317	2,238,351	38,804,259	4,511,383	22,956,381	934,095	142,200	6,882
1903..	911,559	18,843,590	3,198,581	1,709,642	42,684,454	5,649,487	18,139,283	768,562	900,000	45,600
1904..	796,374	16,402,517	3,577,526	2,047,095	41,383,722	5,306,635	35,371,244	1,617,221	477,568	24,350
1905..	684,951	14,159,195	6,000,023	3,621,133	48,092,753	7,497,660	56,864,915	2,676,632	9,413	139,200
1906..	556,415	11,502,120	8,473,739	5,659,455	55,609,888	10,720,474	54,608,217	3,089,187	1,154	23,800
1907..	405,517	8,382,780	12,779,799	8,348,659	56,979,205	11,398,120	47,738,703	2,542,086	1,573	49,100
1908..	476,112	9,842,105	22,106,233	11,686,239	63,702,873	8,413,876	43,195,733	1,814,221	462	3,215
1909..	453,865	9,382,230	27,529,473	14,178,504	52,493,863	6,814,754	45,857,424	1,692,139	18,371	242,699
1910..	493,707	10,205,835	32,569,264	17,580,455	55,692,369	7,094,094	32,987,508	1,216,249	5,053	120,003
1911..	473,159	9,781,077	32,569,044	17,555,272	55,648,011	6,886,998	23,784,969	827,717	2,590	101,072
1912..	611,885	12,648,794	31,955,560	19,440,165	77,832,127	12,718,548	35,763,476	1,697,554	6,415	211,774
1913..	802,973	16,598,923	31,845,803	19,040,924	76,976,925	11,753,606	37,662,703	1,754,705	7,889	186,827
1914..	773,178	15,983,007	28,449,821	15,593,631	75,735,960	10,301,606	36,337,765	1,627,568	10,893	262,563
1915..	118,056	18,977,901	26,025,960	13,228,842	100,785,150	17,410,635	46,316,450	2,593,721	14,895	554,938
1916..	930,492	19,234,976	25,459,741	10,717,121	117,150,028	31,867,150	41,497,615	3,532,082	23,364,760	2,991,623
1917..	738,851	15,272,992	22,221,274	18,091,895	109,227,332	29,687,980	32,576,281	3,628,020	29,668,764	2,640,517
1918..	699,661	14,463,659	21,383,979	20,693,704	118,769,434	29,250,536	31,898,002	4,754,315	35,083,175	2,862,436
1919..	766,764	15,850,423	16,020,637	10,802,474	75,053,581	14,028,265	43,827,699	3,053,037	32,194,707	2,362,445
1920..	765,007	15,814,098	13,330,337	13,450,330	81,600,691	14,244,217	35,953,717	3,214,262	39,863,912	3,057,961
1921..	926,329	19,148,920	13,543,198	8,485,355	47,620,820	5,953,555	66,679,592	3,828,742	53,089,356	2,471,310
1922..	1,263,364	26,116,050	18,626,439	12,576,758	42,879,818	5,738,177	93,307,171	5,817,702	56,290,005	3,217,536
1923..	1,233,341	25,495,421	18,601,744	12,067,509	86,881,537	12,529,186	111,254,466	7,985,522	60,416,440	3,991,701
1924..	1,525,382	31,532,443	19,736,323	13,180,113	104,457,447	13,004,538	175,485,499	14,221,345	98,909,077	6,274,791
1925..	1,735,735	35,880,826	20,228,988	13,971,150	111,450,518	15,649,882	253,590,578	23,127,460	109,268,511	8,328,446
1926..	1,754,228	36,263,110	22,371,924	13,894,531	133,094,942	17,490,300	283,801,265	19,240,661	149,938,105	11,110,413
1927..	1,852,785	38,300,464	22,736,698	12,816,677	140,147,440	17,195,487	11,423,161	16,477,139	165,495,525	10,250,793
1928..	1,890,592	39,082,005	21,936,407	12,761,725	202,696,046	28,589,249	337,946,688	16,544,248	15,553,233	10,143,050
1929..	1,928,308	39,861,663	23,143,261	12,264,308	248,120,760	37,415,251	326,522,566	16,544,248	197,267,087	10,626,778
1930..	2,102,008	43,453,601	26,443,823	10,089,376	303,478,356	37,048,359	382,994,163	13,102,635	267,643,505	9,635,166
1931..	2,693,892	58,098,396	20,562,247	6,141,943	292,304,390	24,114,065	267,342,482	7,260,183	237,245,451	6,059,249
1932..	3,044,387	71,479,273	18,347,907	5,811,081	247,679,070	25,954,058	255,947,378	5,409,704	172,283,558	4,144,454
1933..	3,949,309	84,350,237	15,187,950	5,746,027	299,982,448	21,634,853	266,475,571	6,372,998	190,131,984	6,393,132
1934..	2,972,074	102,536,553	16,415,282	7,790,840	364,761,062	26,671,438	346,276,576	8,436,658	298,579,683	8,057,671
1935..	3,284,890	115,595,279	16,618,538	10,767,148	413,997,700	32,311,960	339,105,079	10,624,772	320,649,859	9,936,908
1936..	3,748,028	131,293,421	12,334,487	8,273,804	421,027,732	39,514,101	383,180,909	14,993,869	333,152,736	11,045,007
1937..	4,096,213	143,326,493	12,977,751	10,312,644	530,028,615	68,917,219	411,999,484	21,053,173	370,337,589	18,153,949
Total	60,406,416	1,484,300,123	738,282,165	435,652,408	5,517,473,579	696,666,353	5,566,623,557	263,181,723	.....	156,852,720

* From 1858 to 1930, inclusive, gold valued at \$20-671834. From 1931 to 1937 valued at world price of Gold in Canadian Funds.

† From 1898 to 1904, quantities show pounds of zinc contained in ores shipped. From 1905 to 1915, quantities show tons of ore or concentrates shipped from mines.

From 1916 to 1937 quantities show recoverable zinc in ores exported plus refined zinc made in Canada.

Table 11.—Historical Summary of Canada's Mineral Production—Continued

Year	Nickel		Cobalt		Arsenic		Platinum*		Palladium	
	Pounds	\$	Pounds	\$	Tons	\$	Fine oz.	\$	Fine oz.	\$
1885.....					440	17,600				
1886.....					120	5,460				
1887.....					30	1,200		5,600		
1888.....					30	1,200		6,000		
1889.....	830,477	498,286						3,500		
1890.....	1,435,742	933,232			25	1,500		4,500		
1891.....	4,035,847	2,421,208			20	1,000		10,000		
1892.....	2,413,717	1,399,956						3,500		
1893.....	3,982,982	2,071,151						1,800		
1894.....	4,907,430	1,870,958			7	420		950		
1895.....	3,888,525	1,360,824						3,800		
1896.....	3,397,113	1,188,990						750		
1897.....	3,997,647	1,399,176						1,600		
1898.....	5,517,690	1,820,838						1,500		
1899.....	5,744,000	2,067,840			57	4,872		825		
1900.....	7,080,227	3,327,707			303	22,725				
1901.....	9,189,047	4,594,523			695	41,676		457		
1902.....	10,693,410	5,025,903			800	48,000	2,385	46,502	4,411	86,014
1903.....	12,505,510	5,002,204			257	15,420	1,710	33,345	3,177	61,952
1904.....	10,547,883	4,219,153	32,000	19,960			551	10,872	952	18,564
1905.....	18,876,315	7,550,526	236,000	100,000			574	11,870	1,003	16,746
1906.....	21,490,955	8,948,534	642,000	80,704	201	14,058	112	3,140	202	2,512
1907.....	21,189,793	9,535,407	1,478,000	104,426	986	47,303	227	7,032	607	
1908.....	19,143,111	8,231,538	2,448,000	111,118	1,702	58,566	172	2,807	328	Values
1909.....	26,282,991	9,461,877	3,066,000	94,965	1,353	67,446	547	13,604	1,271	
1910.....	37,271,033	11,181,310	2,196,000	54,699	2,049	81,044	258	8,437	523	
1911.....	34,098,744	10,229,623	1,704,000	170,890	2,097	76,237	666	28,718	753	Not
1912.....	44,841,542	13,452,463	1,868,000	314,381	2,045	89,262	497	22,638	680	
1913.....	49,676,772	14,903,032	1,642,000	420,386	1,692	101,463	211	9,151	399	
1914.....	45,517,937	13,655,381	702,000	590,406	1,737	104,015	748	33,765	1,272	recorded
1915.....	68,308,657	20,492,597	412,000	383,261	2,396	147,830	475	22,366	600	
1916.....	82,958,564	29,035,497	800,000	805,014	2,186	262,349	1,032	85,418	1,602	
1917.....	84,330,280	33,732,112	674,000	1,138,190	2,936	689,431	1,028	103,661	1,679	
1918.....	92,507,293	37,002,917	780,000	1,640,310	3,560	563,639	689	71,428	1,260	
1919.....	44,544,883	17,817,953	596,000	1,019,479	3,389	509,924	667	74,311	1,128	
1920.....	61,335,706	24,534,282	566,000	1,005,365	2,469	447,848	595	37,680	1,425	
1921.....	19,293,060	6,752,571	251,986	755,958	1,491	233,763	292	22,599	913	
1922.....	17,597,123	6,158,993	669,960	1,852,370	2,576	321,037	470	45,863	1,219	
1923.....	62,453,843	18,332,077	888,061	2,530,974	3,210	626,815	1,217	141,826	2,036	183,560
1924.....	69,536,350	19,470,178	948,704	1,652,395	2,311	348,293	9,186	1,091,427	9,516	863,113
1925.....	73,857,114	15,946,672	1,116,492	2,328,517	1,717	130,302	8,698	1,028,192	8,288	648,969
1926.....	65,714,294	14,374,163	664,778	1,136,014	2,537	146,811	9,521	923,607	10,024	640,178
1927.....	66,798,717	15,262,171	880,590	1,764,534	3,114	211,979	11,228	717,613	11,545	554,190
1928.....	96,755,578	22,518,907	956,590	1,672,320	2,716	193,052	10,532	708,909	13,607	627,833
1929.....	110,275,912	27,115,461	929,415	1,801,915	2,615	171,320	12,519	846,756	17,318	809,289
1930.....	103,768,857	24,455,123	694,163	1,144,007	2,261	129,527	34,024	1,543,251	34,092	895,867
1931.....	65,666,320	15,267,453	521,051	651,179	1,787	135,170	44,775	1,596,900	46,918	1,217,717
1932.....	30,327,968	7,179,862	490,631	587,957	1,212	98,714	27,343	1,099,393	37,613	901,890
1933.....	83,264,658	20,130,480	466,702	597,752	734	56,534	24,786	857,590	31,009	645,043
1934.....	128,687,340	32,139,425	594,671	592,497	824	56,412	116,230	4,490,763	83,932	1,099,228
1935.....	138,513,240	35,345,103	681,419	512,705	1,279	75,326	105,374	3,445,780	84,772	1,962,937
1936.....	169,739,393	43,876,525	887,591	804,676	683	42,491	131,571	5,320,731	103,671	2,483,075
1937.....	224,905,046	59,507,176	507,064	848,145	695	41,032	139,377	6,752,816	119,829	3,179,782
Total.....	2,369,699,136	692,599,798	31,871,868	29,917,469	65,334	6,420,066	700,287	31,305,503	639,574	

* From 1887 to 1901 placer platinum only, 1907 to 1920 represents largely, recovery of platinum metal by the International Nickel Company, in New Jersey and not necessarily from Sudbury ores. For further details refer to 1928 report on the Mineral Production of Canada.

Table 11.—Historical Summary of Canada's Mineral Production—Continued

Year	Iron Ore (*)		Antimony Ore		Chromite		Manganese Ore		Molybdenite Ore and Concentrates Shipped	
	Tons		Tons	\$	Tons	\$	Tons	\$	Tons	\$
1886	64,361		665	31,490	60	945	1,789	41,499		
1887	76,330		584	10,860	38	570	1,245	43,658		
1888	78,887		345	3,696			1,801	47,944		
1889	84,181		55	1,100			1,455	32,737		
1890	76,511		26	625			1,328	32,550		
1891	68,979		10	60			255	6,694		
1892	103,248						115	10,250		
1893	125,602						213	14,578		
1894	109,991				1,000	20,000	74	4,180		
1895	102,797				3,177	41,300	125	8,464		
1896	91,906				2,342	27,004	124	3,975		
1897	50,705				2,637	32,474	15	1,169		
1898	58,343				2,021	24,252	50	1,600		
1899	74,617	1,344	20,000		2,010	21,842	1,581	20,004		
1900	122,000				2,335	27,000	30	1,800		
1901	313,646				1,274	16,744	440	4,820		
1902	404,003				900	13,000	172	4,062	3	400
1903	364,294				3,509	51,129	91	2,775	85	1,275
1904	219,046				6,074	67,146	66	2,740		
1905	291,097		527		8,575	93,301	22	1,720		
1906	248,831		732		9,035	91,859	93	925		
1907	312,856	2,048	70,108		7,196	72,901	1	22		
1908	238,082	148	5,443		7,225	82,008				
1909	268,043	66	5,860		2,470	26,604				
1910	259,418	364	13,906		299	3,734				
1911	210,344				157	2,587	6	300		
1912	215,833						75	1,875		
1913	307,634									
1914	244,854				136	1,210	28	1,120	16	2,063
1915	398,112	1,371	93,171		12,341	179,543	201	9,360	39	28,920
1916	275,176	939	136,360		27,517	311,460	957	89,544	610	188,316
1917	215,302	361	22,000		36,725	499,682	158	14,836	1,554	320,006
1918	211,608				21,984	867,122	440	6,230	461	428,807
1919	197,170				8,541	228,898	661	14,159	46	69,203
1920	129,072				11,016	251,379	649	11,029		
1921	59,509				2,798	55,696	68	3,400		
1922	17,971				767	11,503	73	2,044		
1923	30,759				3,558	52,650	200	1,400		
1924	1,480						584	4,088	10	9,370
1925	3,978	1	206						15	11,176
1926	200	1	281						12	10,472
1927	2,029									
1928	2,244									
1929	2,748				126	900			9	6,400
1930	432						273	1,356		
1931	1,509						117	2,893	1	280
1932					78	1,113				
1933					30	343				
1934	2,023				111	1,578				
1935	2,288				1,144	14,947	100	800		
1936	2,566					13,578	221	1,596		
1937	4,229	24	7,394			43,250	85	817	8	8,147
Total	6,646,574				189,216	3,251,252	15,981	455,010	2,869	1,084,835

(*) 1925 to 1937, inclusive, titanium ore only.

Table 11.—Historical Summary of Canada's Mineral Production—Continued

Year	Selenium		Tellurium		Cadmium		Bismuth	
	lb.	\$	lb.	\$	lb.	\$	lb.	\$
1912.....								
1913.....								
1914.....								
1915.....								
1916.....								
1917.....								
1918.....								
1919.....								
1920.....								
1921.....								
1922.....								
1923.....								
1924.....							12,863	27,913
1925.....							19,667	18,566
1926.....							6,440	6,440
1927.....							2,072	1,033
1928.....					491,894	341,374	14,002	5,067
1929.....					773,976	675,294	194,329	307,114
1930.....					456,582	337,871	12,732	6,366
1931.....	21,500	40,850			323,139	180,958	118,207	157,650
1932.....					65,425	26,824	16,855	7,340
1933.....	48,221	70,345			246,041	78,733	78,303	81,526
1934.....	104,924	171,311	5,130	25,599	293,611	95,665	253,644	301,215
1935.....	366,425	703,536	16,425	32,850	580,530	441,203	13,797	13,245
1936.....	350,857	621,017	35,591	62,997	785,916	699,465	364,165	360,523
1937.....	397,227	687,203	41,490	71,777	745,207	1,222,140	5,711	5,654
Total.....	1,289,154	2,294,262	98,636	193,223	4,762,321	4,099,527	1,112,787	1,299,652

In 1912 there were produced 14 tons of tungsten concentrates. In 1918 the production was 13 tons valued at \$11,700.

Table 11.—Historical Summary of Canada's Mineral Production—Continued

Year	Coal*		Petroleum		Natural Gas		Peat	
	tons	\$	brls.	\$	M Cu. Ft.	\$	tons	\$
1785-1866	2,863,826	4,905,462						
1867	631,320	1,056,725						
1868	623,392	1,073,061						
1869	687,825	1,155,282						
1870	752,635	1,243,139						
1872	3,033,152	5,073,331						
1874	1,063,742	1,763,423						
1875	1,039,974	1,747,016						
1876	994,762	1,729,546						
1877	1,036,670	1,794,415						
1878	1,089,744	1,941,285						
1879	1,126,497	2,050,639						
1880	1,482,714	2,657,194						
1881	1,537,106	2,688,821	368,987					
1882	1,848,148	3,248,446	389,573					
1883	1,818,684	3,109,635	472,866					
1884	1,984,959	3,593,831	571,000					
1885	1,920,977	3,417,807	587,563					
1886	2,116,653	3,739,840	584,061	525,655				
1887	2,429,330	4,388,206	713,728	556,708				
1888	2,602,552	4,674,140	695,208	713,695				
1889	2,658,303	4,894,287	704,690	653,000				
1890	3,084,682	5,676,247	795,030	902,734				
1891	3,577,749	7,019,425	755,298	1,010,211				
1892	3,287,745	6,363,757	779,753	984,438		150,000		
1893	3,785,439	7,359,080	798,406	874,255		376,233		
1894	3,847,070	7,429,468	829,104	835,322		313,754		
1895	3,478,344	6,739,153	826,138	1,086,738		423,032		
1896	3,475,716	7,226,462	726,822	1,155,647		276,301		
1897	3,785,107	7,303,597	709,857	1,011,546		325,873		
1898	4,173,108	8,224,288	758,391	1,061,747		322,123		
1899	4,925,051	10,284,497	808,570	1,202,020		387,271		
1900	5,777,319	13,742,178	710,498	1,151,007		417,094	400	1,200
1901	6,486,325	12,699,243	622,392	1,008,275		339,476	220	600
1902	7,466,681	15,210,877	530,624	951,190		195,992	475	1,663
1903	7,960,264	15,942,833	486,637	1,048,874		202,210	1,100	3,300
1904	8,254,595	16,592,231	503,474	935,895		328,376	800	2,400
1905	8,667,948	17,520,263	634,095	856,028		379,561	80	260
1906	9,762,601	19,732,019	569,753	761,760		583,523	474	1,422
1907	10,511,426	24,381,842	788,872	1,057,088		815,032	50	200
1908	10,886,311	25,194,573	527,987	747,102		1,012,660	60	180
1909	10,501,475	24,781,236	420,755	559,604		1,207,029	60	240
1910	12,909,152	30,909,779	315,895	388,550		1,346,471	841	2,604
1911	11,323,388	26,467,646	291,092	357,073		1,917,678	1,463	3,817
1912	14,512,829	36,019,044	243,336	345,050		2,362,700	700	2,900
1913	15,012,178	37,334,940	228,080	406,439	20,477,838	3,309,381	2,600	10,100
1914	13,637,529	33,471,801	214,805	343,124	21,692,504	3,484,727	655	2,470
1915	13,267,023	32,111,182	215,464	300,572	20,124,162	3,706,035	300	1,050
1916	14,483,295	38,817,481	198,123	392,284	25,467,458	3,953,029	300	1,500
1917	14,046,759	43,199,831	213,832	542,239	27,408,940	5,045,298		
1918	14,977,926	55,192,896	304,741	885,143	20,140,309	4,350,940		
1919	13,919,096	55,622,670	240,466	736,324	19,937,769	4,176,037	986	6,561
1920	16,946,764	82,496,538	196,251	822,235	16,845,513	4,232,642	4,550	18,650
1921	15,057,493	72,451,656	187,541	641,533	14,077,601	4,594,164	1,666	6,664
1922	15,157,431	65,518,497	179,068	611,176	14,682,651	5,846,501	3,000	14,500
1923	16,990,571	72,058,986	170,169	522,018	15,960,583	5,884,618		
1924	13,638,197	53,593,988	160,773	467,400	14,881,336	5,708,636		
1925	13,134,968	49,261,951	332,001	1,250,705	16,902,897	6,833,005	1,370	8,394
1926	16,478,131	59,875,094	364,444	1,311,665	19,208,209	7,557,174		
1927	17,426,861	61,867,463	476,591	1,516,043	21,376,791	8,043,010		
1928	17,564,293	63,757,833	624,184	2,035,300	22,582,586	8,614,182	1,497	5,845
1929	17,496,557	63,065,170	1,117,368	3,731,764	28,378,462	9,977,124	2,607	13,339
1930	14,881,324	52,849,748	1,522,220	5,033,820	29,376,919	10,289,985	2,847	10,932
1931	12,243,211	41,207,682	1,542,573	4,211,674	25,874,723	9,026,754	1,674	7,033
1932	11,738,913	37,117,695	1,044,412	3,022,592	23,420,174	8,599,462	3,248	7,593
1933	13,903,344	35,923,962	1,145,333	3,138,791	23,138,103	8,712,234	1,131	3,449
1934	13,810,193	42,045,942	1,410,895	3,449,162	23,162,324	8,759,652	1,878	7,343
1935	13,888,006	41,963,010	1,446,620	3,492,188	24,910,786	9,363,141	1,340	5,761
1936	15,229,182	45,791,934	1,500,374	3,421,767	28,113,343	10,762,243	1,341	7,376
1937	15,835,954	48,752,048	2,943,750	5,399,353	32,380,991	11,674,802	478	2,676
Total	566,817,749	1,700,114,367	37,400,528	70,427,123		186,492,165	40,221	162,022

* For the years 1919 to 1937 the tonnage shown is the total output of all mines; for previous years the tonnage shown includes only sales, colliery consumption and coal used by the operators.

Table 11.—Historical Summary of Canada's Mineral Production—Continued

Year	Actinolite		Asbestos		Barytes		Bituminous Sands		Corundum	
	Tons	\$	Tons	\$	Tons	\$	Tons	\$	Tons	\$
1880.....			380	24,700						
1881.....			540	35,100						
1882.....			810	52,650						
1883.....			955	68,750						
1884.....			1,141	75,097						
1885.....			2,440	142,441	300	1,500				
1886.....			3,458	206,251	3,864	19,270				
1887.....			4,619	226,976	400	2,400				
1888.....			4,404	255,007	1,100	3,850				
1889.....			6,113	426,554						
1890.....			9,860	1,260,240	1,842	7,543				
1891.....			9,279	999,878						
1892.....			6,082	390,462	315	1,260				
1893.....			6,331	310,156						
1894.....			7,630	420,825	1,081	2,830				
1895.....			8,756	368,175						
1896.....			12,250	429,856	145	715				
1897.....	205	1,845	30,442	445,368	571	3,060				
1898.....			23,785	491,197	1,125	5,533				
1899.....			25,536	485,849	720	4,402				
1900.....			29,141	748,431	1,337	7,605			3	300
1901.....	521	3,126	40,217	1,259,759	653	3,842			387	46,415
1902.....	550	4,400	40,416	1,148,319	1,096	3,957			768	84,465
1903.....	550	3,108	41,677	929,757	1,163	3,931			703	77,510
1904.....			48,465	1,226,352	1,382	3,702			993	109,545
1905.....			68,263	1,503,259	3,360	7,500			1,644	149,153
1906.....			82,185	2,060,143	4,000	12,000			2,274	204,973
1907.....			90,426	2,505,042	1,344	3,000			1,892	177,922
1908.....			90,773	2,573,335	4,312	19,021			1,089	100,398
1909.....			87,300	2,301,775	179	1,120			1,491	162,492
1910.....	30	330	102,215	2,573,603					1,870	198,680
1911.....	67	736	127,414	2,943,108	50	400			1,472	161,873
1912.....	92	1,000	136,301	3,137,279	464	5,104			1,960	239,091
1913.....	66	720	161,086	3,849,925	641	5,410			1,177	137,036
1914.....	119	1,304	117,573	2,909,806	612	6,169			548	72,176
1915.....	220	2,420	136,842	3,574,985	550	6,875			262	33,138
1916.....	250	2,750	154,149	5,228,869	1,368	19,393			67	10,307
1917.....	120	1,320	153,781	7,230,383	3,490	54,027			188	32,153
1918.....	228	2,508	158,259	8,970,797	640	10,165			137	26,112
1919.....	80	880	159,236	10,975,369	468	8,154				
1920.....	100	1,160	199,573	14,792,201	751	22,983			196	24,547
1921.....	78	975	92,761	4,906,230	270	9,567			403	55,965
1922.....	50	575	163,706	5,552,723	289	9,537				
1923.....	53	583	231,482	7,522,506	409	8,548				
1924.....	90	1,225	225,744	6,710,830	151	3,308	531	2,127		
1925.....	40	500	273,524	8,977,546	95	2,259	1,148	4,594		
1926.....	80	1,000	279,403	10,099,423	100	2,307	528	2,112		
1927.....	86	1,075	274,778	10,621,013	56	1,268	2,706	10,824		
1928.....	70	875	273,033	11,238,360	127	2,847	94	374		
1929.....	30	375	306,055	13,172,581	105	2,341	989	3,956		
1930.....	34	437	242,114	8,390,163	66	1,484	2,067	8,268		
1931.....	35	456	164,296	4,812,886	16	363	1,015	4,060		
1932.....			122,977	3,039,721			343	1,372		
1933.....			158,367	5,211,177	20	60	466	1,662		
1934.....	30	365	155,980	4,936,326			862	3,449		
1935.....			210,467	7,054,614			40	160		
1936.....			301,287	9,958,183						
1937.....			410,026	14,505,791			35	142		
Totals.....	3,874	36,048	6,276,103	226,268,102	41,037	300,610	10,824	43,100	19,524	2,104,251

Table 11.—Historical Summary of Canada's Mineral Production—Continued

Year	Diatomite		Feldspar		Fluorspar		Graphite		Grindstones		Garnets	
	tons	\$	tons	\$	tons	\$	tons	\$	tons	\$	tons	\$
1886							500	4,000	4,020	46,545		
1887							300	2,400	5,292	64,008		
1888							150	1,200	5,764	51,129		
1889							242	3,160	3,404	30,863		
1890			700	3,500			175	5,200	4,884	42,340		
1891			685	3,425			260	1,560	4,479	42,587		
1892			175	525			167	3,763	5,122	49,836		
1893			575	4,525					4,480	36,979		
1894							5	400	3,667	31,217		
1895			1,018	2,545			*220	6,150	3,395	30,652		
1896	644	9,960	972	2,583			789	22,455	3,563	31,960		
1897	15	150	1,400	3,290			436	16,240	4,472	40,740		
1898	1,017	16,660	2,500	6,250			600	13,698	4,735	40,590		
1899	1,000	15,000	3,000	6,000			1,310	24,179	4,112	35,265		
1900	336	1,950	318	1,112			1,922	31,040	5,179	47,290		
1901	850	15,300	5,350	10,700			2,210	38,780	4,034	37,275		
1902	1,052	16,470	7,576	15,152			1,095	28,300	4,383	40,018		
1903	835	16,700	13,928	18,966			728	23,745	5,423	46,462		
1904	320	6,400	11,083	22,166			452	11,760	4,509	40,822		
1905	300	3,600	11,700	23,400	12	84	541	16,735	5,460	59,900		
1906			16,948	40,890			387	18,300	5,305	58,314		
1907	30	225	12,584	29,819			579	16,000	5,384	58,876		
1908	30	195	7,877	21,099			251	5,565	3,658	42,053		
1909			12,783	40,383			864	47,800	4,002	46,374		
1910	22	134	15,809	47,667	2	15	1,392	74,087	3,787	41,496		
1911	20	122	17,723	51,939	34	238	1,269	69,576	4,332	46,832		
1912	38	230	13,733	30,916	40	240	2,060	117,122	4,204	46,460		
1913	620	12,138	16,790	60,795			2,162	90,282	4,008	45,300		
1914	650	13,000	18,060	70,824			1,647	107,203	3,783	48,847		
1915	317	12,119	14,559	57,801			2,635	124,223	2,279	31,967		
1916	620	12,139	19,488	71,407	1,284	10,238	3,955	325,362	3,232	49,975		
1917	600	18,000	19,462	89,826	4,249	68,756	3,714	402,892	2,169	38,702		
1918	500	12,500	18,782	112,728	7,362	156,029	3,114	248,870	2,806	70,745		
1919	565	11,300	14,679	86,231	5,063	97,837	1,360	100,221	1,931	56,344		
1920	260	8,600	37,873	280,895	11,235	240,446	2,190	165,617	2,262	74,119		
1921	341	11,268	29,868	230,754	5,519	136,267	937	65,862	1,064	40,637		
1922	219	5,781	27,727	248,402	4,503	102,138	597	31,353	837	30,292		
1923	130	3,250	29,225	237,601	139	1,732	1,113	67,873	1,717	51,483	1,250	100,000
1924	33	838	44,804	358,540	76	1,343	1,334	76,117	2,031	69,111	360	7,200
1925			28,681	235,789	3,886	19,234	2,569	158,763	1,735	61,784		
1926			35,951	310,238			2,727	194,860	1,513	58,986		
1927	266	6,650	29,849	259,151			1,829	111,656	1,317	47,475	2	150
1928	368	8,960	31,897	284,942			1,097	57,041	1,250	45,901		
1929	429	10,330	37,527	340,471	17,870	268,120	1,461	103,474	1,038	37,401		
1930	554	13,247	26,796	268,469	80	1,240	1,535	96,392	235	9,874		
1931	1,610	32,789	18,343	186,961	40	620	548	32,149	198	8,164		
1932	1,496	29,509	7,047	81,982	32	464	346	18,483	200	9,336		
1933	1,789	36,648	10,658	105,117	73	1,064	405	18,367	161	7,079		
1934	1,372	54,910	18,302	147,281	150	2,100	1,518	71,424	353	14,543		
1935	823	33,140	17,742	144,330	75	900	1,782	79,781	373	14,501		
1936	615	13,650	17,846	154,475	75	900		88,812	360	15,352		
1937	643	18,606	21,346	178,222	150	2,550		125,343	251	12,407		
Total	21,329	482,468	751,739	4,990,084	61,949	1,112,555		3,565,335	158,152	2,137,208	1,612	107,850

Table 11.—Historical Summary of Canada's Mineral Production—Continued

Year	Gypsum		Iron Oxides		Magnesitic Dolomite		Magnesium Sulphate		Manganese Bog	
	Tons	\$	Tons	\$	Tons	\$	Tons	\$	Tons	\$
1874	67,830	68,164								
1875	91,485	91,613								
1876	92,765	94,386								
1877	111,980	98,897								
1878	105,455	93,805								
1879	104,993	80,864								
1880	136,935	124,060								
1881	121,270	116,349								
1882	150,272	147,597								
1883	166,152	169,228								
1884	130,141	134,451								
1885	97,552	106,415								
1886	162,000	178,742	350	2,350						
1887	154,008	157,277	485	3,733						
1888	175,887	179,393	397	7,900						
1889	213,273	205,108	794	15,280						
1890	226,509	194,033	275	5,125						
1891	203,605	206,251	900	17,750						
1892	241,048	241,127	390	5,800						
1893	192,568	196,150	1,070	17,700						
1894	223,631	202,031	611	8,690						
1895	226,178	202,608	1,339	14,600						
1896	207,032	178,061	2,362	16,045						
1897	239,691	244,531	3,905	23,560						
1898	219,256	232,515	2,226	17,450						
1899	244,566	257,329	3,919	20,000						
1900	252,101	259,009	1,966	15,398						
1901	293,799	340,148	2,233	16,735						
1902	333,599	379,479	4,955	30,495						
1903	314,489	388,459	6,266	32,760						
1904	345,961	373,474	3,925	24,995						
1905	442,158	586,168	5,105	34,675						
1906	469,022	643,294	6,758	36,125						
1907	485,921	646,914	5,828	35,570						
1908	340,964	575,701	4,746	30,440	120	840				
1909	473,129	809,632	3,940	28,093	330	2,508				
1910	525,246	934,446	4,813	35,185	323	2,160				
1911	518,383	993,394	3,622	28,333	991	5,531				
1912	578,458	1,324,620	7,654	32,410	1,714	9,645				
1913	636,370	1,447,739	5,987	41,774	515	3,335				
1914	516,880	1,156,207	5,890	51,725	358	2,240				
1915	474,815	854,929	6,248	48,353	14,779	126,584				
1916	342,915	738,593	8,811	58,711	55,413	563,829				
1917	336,332	881,934	9,409	87,605	58,090	728,275	929	4,645		
1918	152,287	823,006	17,317	112,440	39,365	1,016,765	1,949	14,565		
1919	299,063	1,215,287	11,862	113,427	11,273	328,465	738	9,115		
1920	429,144	1,893,991	19,128	157,909	18,378	512,756	1,947	39,886		
1921	386,550	1,785,538	9,048	93,610	3,730	81,320	2,029	39,506		
1922	559,265	2,160,898	7,285	110,608	2,849	76,294	1,021	24,017		
1923	578,301	2,243,100	10,424	129,636	4,801	134,382	121	6,580		
1924	646,016	2,208,108	7,266	91,160	3,873	101,356				
1925	740,323	2,389,891	7,118	91,913	5,576	122,325				
1926	883,728	2,770,813	6,626	101,843	4,571	137,431				
1927	1,063,117	3,251,015	6,125	103,536	7,337	230,309				
1928	1,246,368	3,743,648	5,414	111,198	13,195	346,990			385	2,237
1929	1,211,689	3,345,696	6,518	115,932	18,809	491,170			301	1,830
1930	1,070,968	2,818,788	6,596	83,873	13,336	336,162			275	1,650
1931	863,752	2,111,517	5,520	49,205	11,411	295,579			77	462
1932	438,629	1,080,379	5,240	46,161	(e)	262,860				
1933	382,736	675,822	4,357	53,450	(e)	360,128	120	3,360		
1934	461,237	863,776	4,959	66,166	(e)	352,927	42	1,100		
1935	541,864	932,203	5,516	77,075	(e)	486,084	340	7,965		
1936	633,622	1,278,971	5,854	69,630	(e)	768,742	654	13,712		
1937	1,047,187	1,540,483	6,197	83,640	(e)	677,207	727	14,456		
Total	25,822,670	56,668,105	275,549	2,707,777		8,594,199	10,617	178,907	1,038	6,179

(e) Quantity not published since 1931.

Table 11.—Historical Summary of Canada's Mineral Production—Continued

Year	Mica		Mineral Waters		Natro-Alunite		Phosphate		Pulpstones	
	Tons	\$	Imp. Gals	\$	Tons	\$	Tons	\$	Tons	\$
1870.....							1,200	13,600		
1871.....							200	2,100		
1872.....										
1873.....										
1874.....										
1875.....										
1876.....										
1877.....										
1878.....							10,743	208,109		
1879.....							8,446	122,035		
1880.....							13,060	190,086		
1881.....							11,968	218,456		
1882.....							17,153	308,357		
1883.....							19,716	427,668		
1884.....							21,709	424,240		
1885.....							28,969	496,293		
1886.....		29,008					20,495	304,338		
1887.....		29,816					23,690	319,815		
1888.....	15	30,207	124,850	11,456			22,485	242,285		
1889.....		28,718	424,600	37,560			30,988	316,662		
1890.....		68,074	561,165	66,031			31,753	361,045		
1891.....		71,510	427,485	54,268			23,588	241,003		
1892.....		104,745	640,380	75,348			11,932	157,424	60	900
1893.....		75,719	725,066	108,347			7,890	61,962	120	1,400
1894.....		45,581	767,460	110,040			6,861	41,166	90	1,500
1895.....		65,000	739,382	126,048			1,822	9,565	80	1,250
1896.....		60,000	706,372	111,736			570	3,420	60	900
1897.....		76,000	749,691	141,477			908	3,984	100	1,600
1898.....		118,375	555,000	100,000			733	3,665	200	3,200
1899.....		163,000		100,000			3,000	18,000	375	7,000
1900.....		166,000		75,000			1,415	7,105	360	6,160
1901.....		160,000		100,000			1,033	6,280	547	8,415
1902.....	1,059	135,904		100,000			856	4,953	250	4,100
1903.....		177,857		100,000			1,329	8,214	115	1,840
1904.....		160,777		100,000			817	4,590	140	1,960
1905.....		178,235		100,000			1,300	8,425	68	1,875
1906.....	574	303,913		100,000			850	6,375	40	600
1907.....	774	312,599		136,020			824	6,018		
1908.....	436	139,871		151,953			1,596	14,794	158	4,725
1909.....	369	147,782		175,173			998	8,054	240	6,640
1910.....	758	190,385		199,563			1,478	12,578	125	3,700
1911.....	590	128,677		223,758			621	5,206	160	3,960
1912.....	580	143,976		172,465			164	1,640	125	4,000
1913.....	1,104	194,304		173,677			385	3,643	100	3,400
1914.....	595	109,061		134,111			954	7,275	40	4,000
1915.....	417	91,905		115,274			217	2,502		
1916.....	1,208	255,239		127,806			203	2,514		
1917.....	1,166	358,851		145,814			149	1,486	47	2,750
1918.....	747	271,550		154,468			140	1,200	180	8,400
1919.....	2,754	273,788		71,015			24	331	14	420
1920.....	2,203	376,022		24,582					125	10,000
1921.....	702	70,063	328,273	21,716	30	1,500	30	450	200	22,000
1922.....	3,349	152,263	221,433	14,220	50	2,500	190	1,796	150	12,000
1923.....	3,525	326,974	232,451	16,455	15	750	30	600	260	25,100
1924.....	4,091	357,272	209,353	15,421					624	58,113
1925.....	4,020	261,463	190,134	28,413	20	1,000	16	189	781	57,781
1926.....	2,545	229,204	215,356	29,721			40	800	1,155	89,541
1927.....	2,738	174,377	303,530	14,624	7	248	151	1,717	911	75,242
1928.....	3,660	87,168	269,045	33,498			641	8,276	581	52,659
1929.....	4,053	118,549	321,905	16,139			1,185	5,380	754	62,336
1930.....	1,170	96,004	227,141	24,481			40	760	573	49,897
1931.....	1,339	54,066	217,408	13,234					342	27,305
1932.....	309	6,828	76,714	7,170			1,316	12,333	60	3,500
1933.....	944	49,284	38,818	5,441			2,214	5,475	214	9,870
1934.....	998	97,071	97,440	17,738			81	683	523	27,225
1935.....	628	82,038	146,516	16,590			186	1,103	288	14,109
1936.....	801	74,556	154,286	18,516			525	4,927	87	4,500
1937.....	945	133,731	225,019	20,586			100	900	87	4,875
Total.....		7,613,360		4,036,753	122	5,998	341,977	4,654,450	11,509	690,778

Table 11.—Historical Summary of Canada's Mineral Production—Continued

Year	Quartz*		Salt		Sharpening Stones		Silica Brick		Sodium Carbonate	
	tons	\$	tons	\$	tons	\$	M	\$	tons	\$
1886			62,359	227,195						
1887			60,173	166,394						
1888			59,070	185,460						
1889			32,832	129,547						
1890	200	1,000	43,754	198,857						
1891			45,021	161,179						
1892			45,486	162,041						
1893	100	500	62,324	195,926						
1894			57,199	170,687						
1895			52,376	160,455						
1896	10	50	43,960	169,693						
1897			51,348	225,730						
1898	234	570	57,142	248,639	33	985				
1899	600	1,260	59,339	254,390	24	1,000				
1900			62,055	279,458	45					
1901			59,428	262,328						
1902			64,456	292,581						
1903			62,452	297,517						
1904			69,477	321,778						
1905			67,340	320,858	12	600				
1906	48,376	65,765	76,720	329,130	18	900				
1907	56,585	124,148	72,697	342,315	30	1,500				
1908	44,741	52,830	79,975	378,798	27	1,350				
1909	56,924	71,285	84,037	415,219	33	1,650				
1910	88,205	91,951	84,092	409,624	36	1,800				
1911	60,526	83,865	91,582	443,004	54	2,000				
1912	100,242	195,216	95,053	459,582	38	1,300				
1913	78,261	169,842	100,791	491,280	74	2,425				
1914	54,148	84,583	107,038	493,648	115	1,254				
1915	127,108	205,153	119,900	600,226	281	3,615				
1916	136,745	251,226	132,903	717,653	224	2,614				
1917	216,288	496,182	138,909	1,047,792	307	4,302				
1918	268,155	629,813	131,727	1,285,039	56	3,500				
1919	94,991	527,635	148,301	1,397,929	45	3,392				
1920	128,295	467,821	209,855	1,544,724	56	3,987				
1921	100,350	312,947	164,658	1,673,685	17	1,430			197	14,775
1922	109,947	208,598	181,794	1,628,323	18	1,450			202	3,027
1923	264,076	599,250	202,397	1,713,516	35	3,500			265	3,975
1924	150,896	323,156	207,979	1,374,780	36	3,600			510	5,173
1925	197,224	363,612	233,746	1,410,697	46	4,600			1,120	8,140
1926	232,082	553,161	262,547	1,480,149	27	2,700	2,665	130,702	595	5,370
1927	233,984	496,364	268,672	1,614,667	23	2,300	1,791	79,527	805	9,995
1928	282,522	523,933	299,445	1,495,971	24	2,400	3,224	155,502	519	4,922
1929	265,949	561,527	330,264	1,578,086	155	6,617	3,951	173,581	600	8,100
1930	226,200	418,127	271,695	1,694,631	22	2,250	2,418	97,379	364	4,550
1931	195,724	303,158	259,047	1,904,149	81	2,634	900	35,740	712	7,351
1932	189,132	276,147	263,543	1,947,551	68	2,899	93	4,304	455	5,450
1933	185,783	297,820	280,115	1,939,874	123	4,970	636	23,185	559	5,773
1934	272,563	482,265	321,753	1,954,953	111	4,710	2,528	85,945	244	1,920
1935	233,002	424,882	360,343	1,880,978	47	5,400	2,461	96,194	242	2,430
1936	1,046,649	597,781	391,316	1,773,144	122	4,872	2,393	97,285	192	1,677
1937	1,377,448	1,129,011	455,957	1,799,465	74	4,147	3,744	181,126	286	2,574
Total.....	7,124,315	11,392,434	7,549,442	43,651,295	2,492	98,653	26,804	1,160,476	7,907	95,202

* Commencing in 1936 includes low-grade fluxing sand.

Table 11.—Historical Summary of Canada's Mineral Production—Continued

Year	Sodium Sulphate		Sulphur*		Talc and Soapstone		Volcanic Dust	
	tons	\$	tons	\$	tons	\$	tons	\$
1886			42,906	193,077	50	400		
1887			38,043	171,194	100	800		
1888			63,479	285,656	140	280		
1889			72,225	307,292	195	1,170		
1890			49,227	123,067	917	1,239		
1891			25,542	203,193				
1892			26,000	179,310	1,374	6,240		
1893			22,245	175,626	717	1,920		
1894			16,616	121,581	916	1,640		
1895			14,021	102,594	475	2,138		
1896			13,823	101,155	410	1,230		
1897			15,953	116,730	157	550		
1898			13,209	128,872	405	1,000		
1899			11,352	110,748	450	1,960		
1900			16,413	155,164	1,420	6,865		
1901			14,457	120,544	259	842		
1902			14,603	138,939	689	1,804		
1903			13,933	127,713	990	2,739		
1904			15,244	134,033	840	1,875		
1905			13,669	125,486	500	1,300		
1906			17,525	169,990	1,234	3,030		
1907			18,960	212,491	1,534	4,602		
1908			19,408	224,824	1,016	3,048		
1909			26,504	222,814	4,350	10,300		
1910			22,087	187,062	7,112	22,308		
1911			33,893	365,820	7,300	22,100		
1912			33,426	314,081	8,270	23,132		
1913			65,012	521,181	12,250	45,980		
1914			93,609	744,508	10,808	40,418		
1915			116,157	985,190	11,885	40,554		
1916			116,975	1,084,095	13,104	49,423		
1917			155,453	1,610,762	15,803	76,539		
1918			154,269	1,705,219	18,169	119,197		
1919			65,674	522,704	18,642	116,295		
1920	811	19,496	67,608	719,110	21,671	166,934		
1921	623	18,850	12,213	116,326	10,124	144,565		
1922	504	11,980	6,900	74,303	13,195	188,458		
1923	733	10,189	11,073	113,020	10,366	150,507		
1924	1,083	6,004	9,742	95,620	11,332	154,480	245	1,103
1925	3,876	19,380	7,587	58,899	14,474	205,835	160	1,350
1926	6,775	13,550	8,975	63,899	15,767	217,195	90	630
1927	5,659	11,319	25,229	198,388	16,521	236,105	105	735
1928	6,016	68,804	38,589	321,033	16,058	219,358	485	9,795
1929	5,018	64,112	42,781	350,843	16,698	229,198	300	6,000
1930	31,571	293,847	37,730	314,835	27,247	186,216	242	4,840
1931	44,957	421,097	50,107	429,457	21,916	157,083	128	2,560
1932	22,466	271,736	53,172	470,014	13,275	159,038	180	3,600
1933	50,080	485,416	57,373	510,299	16,829	190,836	118	2,360
1934	66,821	587,986	51,537	515,502	15,532	180,777	31	620
1935	44,817	343,764	67,446	634,235	15,301	171,532		
1936	75,598	552,681	122,132	1,033,055	16,587	177,270		
1937	79,884	618,028	130,913	1,154,992	15,939	163,814		
Total	447,292	3,818,239			431,313	3,911,919	2,084	33,623

* From 1892 to 1927 figures show sulphur content of pyrites shipped. Since 1927 figures include sulphur in pyrites shipped plus sulphur recovered from smelter gases.

Table 11.—Historical Summary of Canada's Mineral Production—Continued

Year	Clay Products	Cement		Lime		Sand and Gravel	
	\$	Brls.	\$	tons	\$	tons	\$
1886.....	1,126,057				283,755	124,865	24,226
1887.....	1,398,907	69,843	81,909		394,859	180,860	30,307
1888.....	1,494,673	50,668	35,593		339,951	260,929	38,398
1889.....	1,652,334	90,474	69,790		362,848	233,044	52,647
1890.....	2,041,101	102,216	92,405		412,308	342,158	65,518
1891.....	1,802,932	93,479	108,561		251,215	243,724	59,501
1892.....	2,177,968	117,408	147,663		411,270	297,878	85,329
1893.....	2,619,590	158,597	194,015		900,000	329,116	121,795
1894.....	2,560,236	108,142	144,637		900,000	324,656	86,940
1895.....	2,487,248	128,294	173,675		700,000	277,162	118,359
1896.....	2,227,962	149,090	201,651		650,000	224,769	80,110
1897.....	2,325,903	205,213	275,273		650,000	152,963	76,729
1898.....	2,690,974	250,209	397,580		650,000	165,954	90,498
1899.....	2,988,099	396,753	633,291		800,000	242,450	101,640
1900.....	3,195,105	417,552	662,910		800,000	197,558	101,666
1901.....	3,382,706	450,394	660,030		830,000	197,302	117,465
1902.....	3,625,489	722,525	1,127,550		892,000	159,793	119,120
1903.....	4,034,289	719,993	1,225,247		900,000	355,792	124,006
1904.....	3,841,560	967,172	1,338,239		780,000	399,809	189,803
1905.....	4,709,842	1,360,732	1,924,014		750,000	306,935	152,805
1906.....	5,072,635	2,128,374	3,170,859	183,064	1,009,177	336,550	139,712
1907.....	5,772,117	2,441,868	3,781,371	166,436	974,595	298,095	119,853
1908.....	4,500,702	2,666,333	3,709,954	126,051	712,947	298,954	161,387
1909.....	6,450,840	4,067,709	5,345,802	195,752	1,132,756	481,584	256,166
1910.....	7,629,956	4,753,975	6,412,215	204,685	1,137,079	624,824	407,974
1911.....	8,359,933	5,692,915	7,644,937	263,673	1,517,599	573,494	408,110
1912.....	10,575,869	7,132,732	9,106,556	296,654	1,844,849		1,512,099
1913.....	9,504,314	8,658,805	11,019,418	264,547	1,609,398		2,258,874
1914.....	6,871,957	7,172,480	9,187,924	246,000	1,360,628		2,505,310
1915.....	3,914,488	5,681,032	6,977,024	176,654	1,015,702		1,624,767
1916.....	4,120,805	5,369,560	6,547,728	192,246	1,091,463	8,156,207	1,838,320
1917.....	4,779,038	4,768,488	7,724,246	229,851	1,558,487	9,182,417	2,326,249
1918.....	4,583,489	3,591,481	7,076,503	222,738	1,876,025	11,262,282	2,367,018
1919.....	7,906,366	4,995,257	9,802,433	250,163	2,310,607	10,364,481	2,680,460
1920.....	10,664,929	6,651,980	14,798,070	329,957	3,818,553	11,530,795	4,201,067
1921.....	8,857,818	5,752,885	14,195,143	240,767	2,781,197	11,574,862	2,537,249
1922.....	11,438,456	6,943,972	15,438,481	314,054	3,165,005	11,666,374	3,502,935
1923.....	10,483,016	7,543,589	15,064,661	351,236	3,266,608	12,752,515	3,016,518
1924.....	9,215,077	7,498,624	13,398,411	319,793	3,178,541	11,603,500	3,181,083
1925.....	9,529,691	8,116,597	14,046,704	358,979	3,387,652	11,018,647	3,220,410
1926.....	10,357,323	8,707,021	13,013,283	413,901	3,781,484	17,112,798	4,941,434
1927.....	11,173,189	10,065,865	14,391,937	444,753	3,923,388	22,952,819	6,055,601
1928.....	12,381,718	11,023,928	16,739,163	508,889	4,534,568	28,102,917	5,809,431
1929.....	13,904,643	12,284,081	19,337,235	674,087	5,908,610	27,846,945	7,317,814
1930.....	10,593,578	11,032,538	17,713,067	490,802	4,038,698	28,547,511	8,344,913
1931.....	7,841,288	10,161,658	15,826,243	344,785	2,764,415	21,748,586	6,651,165
1932.....	3,650,218	4,498,721	6,930,721	320,650	2,394,537	14,469,942	4,480,596
1933.....	2,262,835	3,007,432	4,536,935	323,540	2,432,306	11,738,823	4,464,285
1934.....	2,680,410	3,783,226	5,667,946	368,113	2,745,797	14,854,159	4,035,477
1935.....	3,012,563	3,648,086	5,580,043	405,419	2,925,791	21,213,489	6,389,440
1936.....	3,471,027	4,508,718	6,908,192	468,401	3,335,970	22,124,160	6,921,399
1937.....	4,516,859	6,168,971	9,095,867	549,353	3,824,917	27,001,301	10,492,696
Total.....	288,460,122	207,077,655	329,683,105		94,017,555		116,006,674

Table 11.—Historical Summary of Canada's Mineral Production—Concluded

Year	Limestone		Sandstone		Granite		Marble		Slate	
	tons	\$	tons	\$	tons	\$	tons	\$	tons	\$
		\$								
1886		650,384			6,062	63,309	501	9,900	5,345	64,675
1887		581,367			21,217	142,506	242	6,224	7,357	89,000
1888		664,825			21,352	147,305	191	3,100	5,314	90,689
1889		937,000			10,197	79,624	83	980	6,935	119,160
1890		984,787			13,307	65,985	780	10,776	6,368	100,250
1891		723,004			13,637	70,056	240	1,752	5,000	65,000
1892		633,188			24,302	89,326	340	3,600	5,180	69,070
1893		1,131,006			22,521	94,393	590	5,100	7,112	90,825
1894		1,269,645			16,392	109,936				75,550
1895		1,136,603			19,238	84,838	200	2,000		58,900
1896		1,042,850			18,717	106,709	224	2,405		53,370
1897		1,037,448			10,345	61,934				42,800
1898		1,335,403			23,897	81,073				40,791
1899		1,551,886			13,418	90,542				33,406
1900		1,564,582				80,000				12,100
1901		1,837,737				155,000			715	9,980
1902		2,127,055				210,000				19,200
1903		2,230,939				200,000			5,510	22,040
1904		2,114,315				150,000			5,277	23,247
1905		2,072,758				226,305				21,568
1906		2,084,056				278,419				24,446
1907		1,832,550			151,136	194,712			4,335	20,056
1908		1,681,293				282,320		125,000	2,950	13,496
1909		2,139,691		374,179		454,824		158,441	4,000	19,000
1910		2,249,576		502,148		739,516		158,779	3,959	18,492
1911		2,594,926		451,183		1,119,865		162,783	1,833	8,248
1912		2,762,936		329,352		1,373,119		260,764	1,894	8,939
1913		3,204,091		396,782		1,653,791		249,975	1,432	6,444
1914		2,672,781		487,140		2,176,602		132,533	1,075	4,837
1915		2,312,081		249,336		1,525,553		158,027	397	2,039
1916		2,224,091		146,244		1,247,267		118,810	1,262	6,223
1917		2,283,659		261,256		639,412		55,820	1,422	7,789
1918		2,342,403		102,750		590,871		550	933	5,124
1919		3,074,815		86,577		850,563		213,982	1,632	10,853
1920		5,605,693		165,149		1,508,916		240,593		14,200
1921	3,322,024	5,155,046	28,426	78,036	319,398	937,894	1,650	172,720		22,325
1922	3,152,124	4,175,941	25,221	80,908	457,925	1,486,250	1,912	231,894	1,899	14,871
1923	3,687,663	4,475,921	22,766	66,547	398,432	1,159,303	2,473	201,518	1,836	17,289
1924	4,249,061	4,831,684	94,603	240,273	419,971	1,013,345	4,379	322,455		
1925	4,643,853	5,049,563	87,502	145,757	971,718	2,014,535	3,046	254,922		
1926	5,283,745	5,657,328	44,127	112,347	1,064,423	1,574,627	5,295	521,572		
1927	6,438,379	7,145,917	132,799	232,793	730,009	1,383,557	5,209	503,037		
1928	6,949,420	7,267,437	100,951	223,236	1,195,810	2,366,946	7,753	414,682		
1929	7,720,840	8,172,681	159,407	398,974	1,728,165	3,080,815	14,012	414,062		
1930	7,732,675	8,075,616	384,610	769,060	1,851,132	3,379,951	26,089	809,582	150	3,000
1931	6,262,430	6,305,538	924,101	1,332,883	1,190,887	2,763,050	20,442	668,713	250	5,000
1932	3,687,241	3,227,715	500,480	349,458	490,822	1,110,582	12,379	250,706	250	3,750
1933	2,572,911	2,142,516	99,043	108,562	256,723	679,585	10,897	65,913	250	3,750
1934	3,747,779	3,157,832	115,169	143,283	200,285	781,739	13,783	69,475	738	4,802
1935	3,631,665	3,253,573	342,824	838,005	326,354	1,126,287	15,975	85,369	1,129	4,329
1936	3,731,548	3,143,872	285,508	495,856	941,743	1,319,313	22,866	169,698	1,247	5,414
1937	5,542,806	4,673,942	235,165	343,871	1,135,099	1,827,433	21,642	88,595	900	5,519
Total		*119,438,865		*9,511,945		44,949,803		7,326,807		1,361,856

* Total value from 1909 to 1937.

NOTE.—In the following provincial tables the value of gold includes the exchange equalization. For further information on the price of gold see Chapter II.

Table 12.—Mineral Production of Nova Scotia,* 1935-1937

Product	1935		1936		1937	
	Quantity	Value	Quantity	Value	Quantity	Value
		\$		\$		\$
METALLICS—						
Antimony..... pound					48,163	7,394
Copper..... pound			779,307	73,855	180,609	23,620
Gold..... fine oz.	9,376	329,942	11,960	418,959	19,918	696,931
Lead..... pound			1,901,712	74,414	418,086	21,364
Silver..... fine oz.	372	241	107,642	48,576	26,990	12,113
Zinc..... pound			6,180,219	204,874	5,485,550	268,902
NON-METALLICS—						
Coal..... tons	5,822,075	20,391,227	6,649,102	22,973,281	7,256,954	25,640,819
Diatomite..... tons	666	26,660	565	11,300	481	15,392
Grindstones..... tons	50	2,006	70	2,242	37	4,415
Gypsum..... tons	454,703	523,216	729,019	808,294	926,796	978,288
Quartz..... tons	9,640	13,978	6,764	10,819	11,732	14,078
Salt..... tons	38,701	161,659	38,774	183,915	47,865	216,401
Silica brick..... M	1,968	73,218	1,922	70,570	2,926	121,146
CLAY PRODUCTS AND OTHER STRUCTURAL MATERIALS—						
Clay products..... tons		270,478		355,254		406,846
Lime—						
Quicklime..... tons	10,998	80,408	15,163	113,569	17,289	145,737
Hydrated lime..... tons	333	2,290	501	5,661	398	4,378
Sand and gravel..... tons	1,423,557	685,973	1,947,471 (a)	941,366	2,992,429	1,457,266
Stone..... tons	212,465	621,832	254,572	375,329	178,721	279,098
Total		23,183,128		26,672,278		30,314,188

* In 1935, 208,002 long tons of pig iron were produced in Nova Scotia from Newfoundland ores; production in 1937 totalled 320,318 long tons and in 1936—257,148 long tons.

(a) Includes 17,975 tons worth \$2,663 produced in Prince Edward Island.

Table 13.—Mineral Production of New Brunswick, 1935-1937

	1935		1936		1937	
	Quantity	Value	Quantity	Value	Quantity	Value
		\$		\$		\$
METALLICS—						
Manganese ore..... tons	100	800	221	1,596	85	817
NON-METALLICS—						
Coal..... tons	346,024	1,129,019	368,618	1,190,032	364,714	1,180,611
Grindstones..... tons	456	21,175	412	17,982	288	12,139
Gypsum..... tons	30,796	105,960	38,470	123,560	36,906	131,727
Natural gas..... M cu. ft.	615,454	303,886	606,246	298,819	576,671	283,922
Petroleum..... brls.	12,954	18,230	17,112	24,075	18,089	25,496
CLAY PRODUCTS AND OTHER STRUCTURAL MATERIALS—						
Clay products.....		62,478		102,256		123,876
Lime—						
Quicklime..... tons	9,569	74,721	11,004	80,173	11,630	90,067
Hydrated lime..... tons	6,703	50,054	6,838	47,843	8,269	60,265
Sand and gravel..... tons	1,813,206	845,981	970,945	567,797	1,136,013	715,652
Stone..... tons	85,144	208,723	59,431	133,758	57,468	139,041
Total		2,821,027		2,587,891		2,763,642

Table 14.—Mineral Production of Quebec,* 1935-1937

Product	1935		1936		1937	
	Quantity	Value	Quantity	Value	Quantity	Value
METALLICS—		\$		\$		\$
Chromite..... tons	346	5,371	545	8,508	210	3,286
Copper..... lb.	79,050,906	6,162,350	66,340,175	6,287,058	94,653,132	12,378,737
Gold.....fine oz.	470,552	16,558,725	666,905	23,361,683	711,480	24,894,685
Lead..... lb.	2,047,624	64,156	2,047,689	80,126	1,521,182	77,732
Selenium..... lb.	206,421	396,328	168,417	298,098	208,531	360,759
Silver.....fine oz.	668,836	433,338	724,339	326,872	908,590	407,784
Tellurium..... lb.	1,708	3,416	19,502	34,519	26,439	45,739
Titanium ore, sold for export..... tons	2,288	16,400	2,566	18,318	4,229	26,432
Zinc..... lb.	5,322,844	164,955	6,896,123	228,606	8,566,927	419,951
NON-METALLICS—						
Asbestos..... tons	210,467	7,054,614	301,287	9,958,183	410,025	14,505,541
Feldspar..... tons	7,002	63,075	8,115	75,703	12,285	105,612
Graphite..... tons	21	1,281				
Iron oxides (ochre)..... tons	5,357	75,388	5,458	65,630	5,617	77,640
Magnetitic dolomite.....		486,084		768,742		677,207
Mica..... tons	373	74,894	272	63,123	546	124,594
Natural mineral waters.....Imp. gal	126,616	15,113	131,186	17,399	198,319	19,697
Peat..... tons			45	255		
Phosphate..... tons	116	1,043	525	4,927	100	900
Quartz..... tons	51,948	226,839	78,975	320,634	127,535	448,827
Sulphur..... tons	7,370	47,779	43,084	282,743	28,534	194,496
Soapstone.....		32,053		32,770		40,513
CLAY PRODUCTS AND OTHER STRUCTURAL MATERIALS—						
Cement..... brls.	1,751,012	2,472,008	2,093,130	2,945,074	2,578,623	3,537,798
Clay products.....		593,162		691,765		1,053,153
Lime—						
Quicklime..... tons	91,086	545,956	99,311	592,833	118,040	778,216
Hydrated lime..... tons	25,387	132,910	33,943	125,752	38,273	130,900
Sand and gravel..... tons	5,268,987	1,442,468	5,490,280	1,418,231	9,476,000	2,637,495
Stone..... tons	1,390,517	2,053,761	1,513,249	1,728,512	1,957,982	2,212,550
Slate..... tons	819	1,229	803	855	414	471
Total.....		39,124,696		49,736,919		65,160,215

* There is also in this province an important production of aluminium from imported ores.

Table 15. Mineral Production of Ontario,* 1935-1937

Products	1935		1936		1937	
	Quantity	Value	Quantity	Value	Quantity	Value
		\$		\$		\$
METALLICS—						
Arsenic (As ₂ O ₃)..... lb.	2,558,789	75,326	1,365,606	42,491	1,389,426	41,032
Bismuth..... lb.	7,079	6,796	3,552	3,516	5,711	5,654
Chromite..... tons		9,576		5,070		39,964
Cobalt..... lb.	681,419	512,705	887,591	804,676	507,064	848,145
Copper..... lb.	252,027,928	19,295,965	287,914,078	26,898,920	322,039,208	41,716,364
Gold..... fine oz.	2,220,336	78,133,624	2,378,503	83,318,960	2,587,095	90,522,454
Lead..... lb.	22,532	706	17,442	683	29,849	1,525
Molybdenite (concentrates)..... tons					8	8,147
Nickel..... lb.	138,516,240	35,345,103	169,739,393	43,876,525	224,790,974	59,469,423
Palladium, Rhodium, etc..... fine oz.	84,772	1,962,937	103,671	2,483,075	119,829	3,179,782
Platinum..... fine oz.	105,335	3,444,455	131,551	5,319,922	139,355	6,751,750
Selenium..... lb.	75,363	144,697	106,300	188,151	116,696	201,884
Silver..... fine oz.	5,161,651	3,344,229	5,219,366	2,355,343	4,693,047	2,106,286
Tellurium..... lb.	14,275	28,550	10,197	18,049	6,651	11,506
Zinc..... lb.					120,011	5,883
Non-METALLICS—						
Asbestos..... tons					1	250
Diatomite..... tons	100	4,600	40	2,000	38	1,868
Feldspar..... tons	8,656	75,003	8,409	70,840	9,061	72,610
Fluorspar..... tons	75	900	75	900	150	2,550
Graphite..... tons	1,761	78,500		88,812		125,343
Gypsum..... tons	38,247	164,807	40,191	182,783	53,780	233,895
Mica..... tons	255	7,144	529	11,433	399	9,137
Natural mineral waters..... imp. gal.	19,900	1,477	23,100	1,117	26,700	889
Natural gas..... M cu. ft.	8,158,825	4,938,084	10,006,743	6,052,294	10,746,334	6,588,798
Nepheline syenite..... \$				37,426		121,481
Peat..... tons	1,340	5,761	1,296	7,121	478	2,676
Petroleum..... brls.	165,041	346,156	165,495	350,767	165,205	356,000
Phosphate..... tons	70	60				
Quartz..... tons	83,034	120,005	(a) 884,585	216,037	1,142,372	633,073
Salt..... tons	320,003	1,698,508	350,044	1,557,078	407,701	1,539,599
Silica brick..... M	493	22,976	471	26,715	818	59,980
Sulphur†..... tons	13,292	132,920	14,152	141,520	14,009	140,090
Talc..... tons	13,710	138,161	14,461	143,701	12,457	123,301
CLAY PRODUCTS AND OTHER STRUCTURAL MATERIALS—						
Cement..... brls.	1,243,836	1,752,148	1,542,463	2,180,895	2,650,652	3,657,067
Clay products.....		1,370,225		1,573,936		2,033,845
Lime—						
Quicklime..... tons	196,761	1,470,721	219,943	1,674,851	268,304	1,874,405
Hydrated lime..... tons	23,379	226,146	26,650	271,209	26,163	278,239
Sand and gravel..... tons	8,770,117	2,211,406	8,498,153	2,227,620	8,832,526	3,613,854
Stone..... tons	2,122,941	1,863,892	2,706,420	2,396,376	4,222,700	3,661,510
Slate..... tons			260	2,080	300	2,258
Total.....		158,934,269		184,532,892		230,042,517

* The total production of blast-furnace pig-iron in Ontario from foreign ores and scrap in 1936 was 421,083 long tons; in 1937 it was 578,537 long tons, and in 1935 it was 391,873 long tons.

† Sulphur content of pyrites shipped and estimated sulphur salvaged from smelter gases.

(a) includes low grade silica sand for fluxing purposes since 1936.

Table 16.—Mineral Production of Manitoba, 1935-1937

Products	1935		1936		1937	
	Quantity	Value	Quantity	Value	Quantity	Value
		\$		\$		\$
METALLICS—						
Cadmium..... lb.			148,133	131,838	164,223	269,326
Copper..... lb.	38,011,371	2,963,146	29,853,220	2,829,190	44,920,835	5,874,747
Gold..... fine oz.	142,613	5,018,551	139,273	4,878,733	157,949	5,526,636
Lead..... lb.	19,179	601				
Selenium..... lb.	65,074	124,942	50,760	89,845	43,920	75,982
Silver..... fine oz.	1,206,454	781,660	791,489	357,175	905,179	406,253
Tellurium..... lb.	340	680	3,928	6,953	5,124	8,865
Zinc..... lb.	51,129,980	1,584,513	36,744,951	1,218,095	36,221,314	1,775,569
NON-METALLICS—						
Coal..... tons	3,106	7,408	4,029	9,525	3,172	7,709
Feldspar..... tons	2,084	6,252	1,322	7,932		
Gypsum..... tons	10,500	85,885	12,064	87,076	13,941	88,095
Lithium minerals..... \$						1,694
Natural gas..... M cu. ft.	600	180	600	180	600	180
Quartz..... tons	147	220	90	45		
Salt..... tons	1,538	18,765	2,498	32,151	3,391	43,465
CLAY PRODUCTS AND OTHER STRUCTURAL MATERIALS—						
Cement..... brls.	266,457	604,857	348,042	783,095	328,518	745,736
Clay products.....		74,755		55,504		95,531
Time.....						
Quicklime..... tons	14,594	115,149	17,314	133,227	18,252	143,040
Hydrated lime..... tons	4,021	70,368	4,446	77,808	4,345	72,125
Sand and gravel..... tons	1,399,659	404,730	1,852,606	545,130	1,380,957	551,464
Stone..... tons	146,614	189,755	49,506	71,965	41,191	65,228
Total.....		12,052,417		11,315,527		15,751,645

Table 17.—Mineral Production of Saskatchewan, 1935-1937

Products	1935		1936		1937	
	Quantity	Value	Quantity	Value	Quantity	Value
		\$		\$		\$
METALLICS—						
Cadmium..... lb.			111,749	99,457	144,553	237,067
Copper..... lb.	11,429,452	890,974	14,971,609	1,418,859	22,436,843	2,934,290
Gold..... fine oz.	14,323	504,026	48,981	1,715,804	65,886	2,305,351
Selenium..... lb.	19,587	37,569	25,350	44,923	28,080	43,578
Silver..... fine oz.	201,608	130,622	642,497	289,940	821,818	368,840
Tellurium..... lb.	102	204	1,964	3,476	3,276	5,667
Zinc..... lb.	8,974,720	278,126	27,692,869	918,019	32,750,910	1,605,449
Coal..... tons	921,785	1,293,668	1,020,792	1,463,680	1,049,348	1,494,337
Quartz..... tons	77,177	59,069	76,089	49,458	95,809	33,533
Salt..... tons	101	2,046				
Sodium sulphate..... tons	44,817	343,764	75,598	552,681	79,804	617,548
Natural gas..... M cu. ft.	75,558	7,555	90,839	33,985	100,380	35,130
CLAY PRODUCTS AND OTHER STRUCTURAL MATERIALS—						
Clay products.....		98,150		95,584		115,330
Sand and gravel..... tons	502,732	171,170	716,910	284,531	822,447	470,343
Total.....		3,816,943		6,970,397		10,271,463

† Low grade silica sand for fluxing purposes.

Table 18.—Mineral Production of Alberta, 1935-1937

Products	1935		1936		1937	
	Quantity	Value	Quantity	Value	Quantity	Value
METALLICS		\$		\$		\$
Gold.....fine oz.	150	5,279	109	3,818	46	1,610
Silver.....fine oz.	16	10	9	4	4	2
NON-METALLICS—						
Bituminous sands..... tons	40	160			35	142
Coal..... tons	5,462,894	14,094,795	5,696,960	14,659,705	5,562,839	14,563,911
Natural gas..... M cu. ft.	16,060,349	4,113,436	17,407,820	4,376,720	20,955,506	4,766,437
Petroleum..... brls.	1,263,510	3,102,227	1,312,368	3,019,930	2,749,085	4,961,092
Sodium Sulphate..... tons					80	480
CLAY PRODUCTS AND OTHER STRUCTURAL MATERIALS—						
Cement..... brls.	219,555	436,914	243,534	482,197	267,106	531,541
Clay products.....		326,679		315,777		338,638
Lime—						
Quicklime..... tons	6,354	54,803	8,879	75,756	10,224	89,209
Hydrated lime..... tons	230	2,305	250	2,503		4,269
Sand and gravel..... tons	653,511	146,092	894,880	339,928	711,966	312,687
Stone..... tons	2,242	6,981	13,916	29,388	13,225	27,189
Total.....		22,289,631		23,305,726		25,597,117

Table 19.—Mineral Production of British Columbia, 1935-1937

Products	1935		1936		1937	
	Quantity	Value	Quantity	Value	Quantity	Value
METALLICS—		\$		\$		\$
Bismuth..... lb.	6,718	6,449	360,613	357,007		
Cadmium..... lb.	580,530	441,203	526,034	468,170	436,431	715,747
Copper..... lb.	38,478,043	2,999,525	21,169,343	2,006,219	45,797,988	5,989,461
Gold.....fine oz.	391,633	13,781,565	451,938	15,831,388	505,857	17,699,936
Lead..... lb.	336,784,326	10,552,059	376,645,367	14,738,133	403,589,913	20,623,445
Nickel..... lb.			(a)	(a)		37,753
Platinum..... fine oz.	39	1,275	20	809	22	1,066
Silver.....fine oz.	9,178,400	5,946,677	9,748,715	4,399,303	11,530,177	5,174,859
Zinc..... lb.	255,222,315	7,909,314	255,668,574	8,475,413	287,192,877	14,078,195
NON-METALLICS—						
Coal..... tons	1,331,287	5,043,510	1,489,171	5,493,425	1,598,843	5,863,849
Diatomite..... tons	57	1,880	10	350	124	1,346
Grindstones, pulpstones..... tons	202	10,829	87	4,500	87	4,875
Gypsum..... tons	7,618	52,335	14,078	77,258	15,764	108,478
Iron oxides (ochre)..... tons	159	1,087	396	4,000	580	6,000
Magnesium Sulphate..... tons	349	7,965	654	13,712	727	14,456
Quartz..... tons	11,056	4,771	146	788		
Sodium carbonate..... tons	242	2,430	192	1,677	286	2,574
Sulphur*..... tons	46,784	453,536	64,896	608,792	88,370	820,406
Talc..... tons	93	1,318	47	799		
CLAY PRODUCTS AND OTHER STRUCTURAL MATERIALS—						
Cement..... brls.	167,226	314,116	281,549	516,931	344,072	623,725
Clay products.....		216,636		280,891		349,640
Lime—						
Quicklime..... tons	12,685	83,664	19,885	119,563	22,799	131,709
Hydrated lime..... tons	3,319	16,296	4,274	15,222	4,940	22,328
Sand and gravel..... tons	1,381,720	481,620	1,753,415	596,796	1,648,963	733,935
Slate..... tons	310	3,100	184	2,479	186	2,790
Stone..... tons	356,695	358,290	384,571	393,411	463,425	549,225
Total.....		48,692,050		54,407,036		73,555,798

* Includes sulphur content of pyrites shipped and estimated sulphur contained in sulphuric acid and other products made from waste smelter gases.

(a) Crude nickel ore was mined and exported to Japan.—Data not available.

Table 20.—Mineral Production of Yukon, 1935-1937

Products	1935		1936		1937	
	Quantity	Value	Quantity	Value	Quantity	Value
		\$		\$		\$
METALLICS—						
Gold.....fine oz.	35,707	1,256,529	50,358	1,764,041	47,982	1,678,890
Lead.....lb.	218,513	6,846	2,568,699	100,513	6,440,454	329,107
Silver.....fine oz.	54,715	35,450	783,416	353,532	3,956,504	1,775,719
NON-METALLICS—						
Coal.....tons	835	3,483	510	2,286	84	812
Total.....		1,302,308		2,220,372		3,784,528

Table 21.—Mineral Production of Northwest Territories, 1935-1937

Products	1935		1936		1937	
	Quantity	Value	Quantity	Value	Quantity	Value
		\$		\$		\$
Gold.....oz.	200	7,038	1	35		
Radium and uranium products.....		Not available for publication*				
Lead.....lb.	12,905	404				
Natural gas.....M cu. ft.			1,100	245	1,500	335
Silver.....fine oz.	146,506	94,921	317,014	143,059	135,442	60,788
Petroleum, crude.....brls.	5,115	25,575	5,399	26,995	11,371	56,855
Total.....		127,938		170,334		117,978

* During 1935 the mill at the Eldorado mine treated 14,402 tons of ore; pitchblende and silver concentrates totalled 296 tons valued at \$752,918; during 1935 recovery at the Port Hope refinery of radium, uranium, silver and lead amounted to about \$490,000. In 1936 flotation and other concentrates together with cobbled ore produced totalled 401.5 tons with a gross value of \$1,349,388; shipments from the mine consisted of 326.5 tons of pitchblende concentrate to the Port Hope, Ontario, refinery and 40.5 tons of copper-silver concentrate to Tacoma, Washington, U.S.A. In 1937 shipments from the mine consisted of 396.3 tons of pitchblende-silver concentrates and 169.8 tons of silver-copper concentrates; the total value of finished products of radium, uranium, and silver amounted to \$850,000 according to the 1937 annual printed report of the Eldorado Gold Mines Ltd.

Table 22.—Principal Statistics of the Mineral Industry in Canada, by Industries, 1935-1937

1	2	3	4	5	6	7	8
Year	Number of active firms	Number of operating mines, oil and gas wells, quarries, gravel pits, etc.	Capital employed (excluding ore reserves or other unmined material)	Number of employees	Salaries and wages	Cost of process supplies, purchased electricity and fuel also freight and smelter charges (d)	Net value of bullion, ore, concentrates, residues and other minerals shipped from the mines, smelters, brick and cement plants and quarries (c)
			\$		\$	\$	\$
Metal Mining Industries							
ALLUVIAL GOLD MINES							
1935.....	84	86	9,198,533	702	1,227,971	91,737	2,106,025
1936.....	80	85	10,965,524	853	1,519,659	166,574	2,893,981
1937.....	106	109	11,919,937	1,069	1,689,911	176,560	3,066,636
1938.....							
AURIFEROUS QUARTZ MINES							
1935.....	377	384	193,728,802	19,834	31,523,907	16,594,031	75,120,774
1936.....	580	607	256,018,578	25,097	39,826,742	19,882,784	88,210,233
1937.....	631	659	269,145,649	29,140	48,219,318	24,714,827	97,961,278
1938.....							
COPPER-GOLD-SILVER MINES							
1935.....	16	18	38,461,682	3,430	5,040,196	3,433,284	13,243,163
1936.....	26	27	40,732,717	3,738	5,473,325	3,652,068	15,619,897
1937.....	35	38	73,338,258	5,164	8,240,614	15,832,950	24,902,851
1938.....							
SILVER-COBALT MINES							
1935.....	27	28	6,380,731	402	494,791	246,218	2,070,716
1936.....	24	25	5,946,702	363	458,546	181,592	915,376
1937.....	23	25	2,655,060	300	394,386	312,624	540,762
1938.....							
SILVER-LEAD-ZINC MINES*							
1935.....	69	70	16,596,941	1,657	2,431,110	1,205,822	10,553,086
1936.....	88	89	19,372,600	1,870	2,917,832	1,894,495	13,814,645
1937.....	128	130	29,637,739	2,220	3,914,643	5,788,385	22,740,582
1938.....							
NICKEL-COPPER MINES							
1935.....	4	7	26,685,284	3,552	6,059,407	3,461,632	11,030,621
1936.....	5	9	30,131,192	4,406	7,331,542	4,102,807	18,710,379
1937.....	8	11	33,979,540	5,462	10,193,491	5,185,229	25,812,659
1938.....							
MISCELLANEOUS METAL MINES							
1935.....	12	12	733,497	82	63,612	9,300	22,847
1936.....	11	11	770,957	113	142,974	30,345	3,147
1937.....	15	15	1,320,012	121	155,191	33,385	52,655
1938.....							
NON-FERROUS METAL SMELTING AND REFINING							
1935.....	12	14	145,686,299	8,944	12,687,358	(b)126,804,075	† 59,441,583
1936.....	11	14	143,858,717	10,015	14,346,050	(b)158,460,775	† 71,276,645
1937.....	10	13	162,696,595	11,570	17,990,947	(b)216,470,386	† 101,807,865
1938.....							
Total Metal Mining Industries							
1935.....	601	619	437,471,769	38,603	59,528,350	151,846,099	173,588,815
1936.....	825	867	507,796,987	46,455	72,016,670	188,371,440	211,444,303
1937.....	956	1,000	584,692,790	55,046	90,798,501	268,514,346	276,885,288
1938.....							

*Contains data relating to silver-pitchblende ores in the Northwest Territories. †Value added by smelting.

(b) Includes fuel and electricity used for metallurgical purposes and cost of ores treated which were \$108,051,399 in 1935; \$137,857,432 in 1936 and \$191,303,251 in 1937.

(c) See footnote at end of this table.

(d) See end of table.

Table 22.—Principal Statistics of the Mineral Industry in Canada, by Industries, 1935-1937—Continued

1 Year	2 Number of active firms	3 Number of operating mines, oil and gas wells, quarries, gravel pits, etc.	4 Capital employed (excluding ore reserves or other unmined material) \$	5 Number of employees	6 Salaries and wages \$	7 Cost of process supplies, purchased electricity and fuel also freight and smelter charges (d) \$	8 Net value of bullion, ore, concentrates, residues and other minerals shipped from the mines, smelters, brick and cement plants and quarries (c) \$
Non-Metal Mining Industries, Including Fuels							
*FUELS							
COAL							
1935.....	516	556	110,516,517	26,198	26,595,344	12,851,633	26,894,671
1936.....	516	553	109,703,043	26,918	28,873,135	8,088,154	34,852,621
1937.....	480	503	118,273,848	27,202	31,641,679	8,717,711	37,261,013
1938.....							
NATURAL GAS							
1935.....	199	3,190	69,221,051	1,719	1,932,937	215,918	-6,580,061
1936.....	227	3,253	77,666,568	2,075	2,456,918	79,034	9,062,657
1937.....	218	3,268	75,611,107	2,028	2,488,125	98,880	8,938,446
1938.....							
PETROLEUM							
1935.....	244	2,285	33,398,694	940	1,046,046	808,500	3,217,927
1936.....	256	2,266	33,289,876	1,052	1,298,592	510,016	3,439,317
1937.....	280	2,328	42,147,521	1,620	2,340,359	1,109,966	4,892,672
1938.....							
TOTAL FUELS							
1935.....	969	6,031	213,136,462	28,857	29,574,327	13,876,051	36,692,659
1936.....	999	6,072	220,659,437	30,045	32,628,645	8,677,204	47,354,695
1937.....	978	6,099	236,032,476	30,850	36,470,163	9,920,667	51,092,131
1938.....							
OTHER NON-METAL MINING INDUSTRIES							
ABRASIVES—NATURAL							
1935.....	9	9	114,114	42	25,135	6,326	60,824
1936.....	8	8	77,279	30	17,442	3,528	34,846
1937.....	(a)	(a)	(a)	(a)	(a)	(a)	(a)
1938.....							
ASBESTOS							
1935.....	8	9	16,805,583	2,072	1,904,053	2,058,451	4,996,163
1936.....	10	11	18,877,326	2,647	2,042,924	2,399,475	7,558,708
1937.....	10	11	21,249,676	3,842	4,232,507	4,076,235	10,429,556
1938.....							

*Production of peat since 1929 included in the miscellaneous non-metallics.

(c) See footnote at end of this table.

(a) Included with miscellaneous.

(d) See footnote at end of table.

Table 22.—Principal Statistics of the Mineral Industry in Canada, by Industries, 1935-1937—Continued

1 Year	2 Number of active firms	3 Number of operating mines, oil and gas wells, quarries, gravel pits, etc.	4 Capital employed (excluding ore reserves or other unmined material) \$	5 Number of employees	6 Salaries and wages \$	7 Cost of process supplies, purchased electricity and fuel also freight and smelter charges (d) \$	8 Net value of bullion, ore, concentrates, residues and other minerals shipped from the mines, smelters, brick and cement plants and quarries (c) \$
<i>OTHER NON-METAL MINING INDUSTRIES—Concluded</i>							
<i>FELSPAR QUARTZ AND NEPHELINE SYENITE</i>							
1935.....	28	28	1,151,986	260	182,792	58,012	511,200
1936.....	34	34	1,400,024	324	238,848	160,913	628,769
1937.....	39	39	1,352,992	445	384,698	186,470	1,242,244
1938.....							
<i>GYPSUM</i>							
1935.....	6	13	5,737,114	467	367,007	187,027	745,176
1936.....	9	14	8,954,654	514	440,297	218,869	1,060,102
1937.....	8	13	6,902,222	602	595,396	263,077	1,277,406
1938.....							
<i>IRON OXIDES (OCHRE)</i>							
1935.....	5	5	175,935	32	26,748	12,264	64,836
1936.....	6	6	167,499	39	30,281	11,419	58,211
1937.....	6	6	213,248	50	35,368	13,878	69,762
1938.....							
<i>MICA</i>							
1935.....	24	24	145,557	92	45,217	695	81,343
1936.....	22	22	221,800	101	44,550	4,824	69,732
1937.....	34	34	150,569	199	97,547	17,546	116,185
1938.....							
<i>SALT</i>							
1935.....	10	10	3,776,333	473	597,785	213,940	1,667,038
1936.....	9	9	3,856,187	506	640,644	212,697	1,560,447
1937.....	9	9	4,001,568	543	653,136	259,064	1,540,401
1938.....							
<i>TALC AND SOAPSTONE</i>							
1935.....	8	8	639,501	94	69,803	37,411	134,121
1936.....	7	7	647,929	85	70,935	33,392	143,878
1937.....	7	7	625,497	83	72,020	25,394	138,420
1938.....							
<i>MISCELLANEOUS</i>							
1935.....	44	44	2,555,124	366	357,837	254,948	785,784
1936.....	41	41	2,195,621	477	526,248	548,434	1,006,194
1937†.....	53	53	3,050,376	530	658,723	550,872	1,136,445
1938.....							

(c) See footnote at end of this table.

(d) See footnote at end of this table.

† Includes natural abrasives data for first time.

Table 22.—Principal Statistics of the Mineral Industry in Canada, by Industries,
1935-1937—Continued

1	2	3	4	5	6	7	8
Year	Number of active firms	Number of operating mines, oil and gas wells, quarries, gravel pits, etc.	Capital employed (excluding ore reserves or other unmined material)	Number of employees	Salaries and wages	Cost of process supplies, purchased electricity and fuel also freight and smelter charges (d)	Net value of bullion, ore, concentrates, residues and other minerals shipped from the mines, smelters, brick and cement plants and quarries (c)
			\$		\$	\$	\$

TOTAL OTHER NON-METAL MINING INDUSTRIES

1935.....	142	150	31,101,247	3,898	3,576,377	2,829,074	9,046,485
1936.....	146	152	36,398,319	4,723	4,652,169	3,593,551	12,120,887
1937.....	166	172	37,546,148	6,294	6,729,395	5,392,538	15,950,419
1938.....							

Total Non-Metal Mining Industries, Including Fuels

1935.....	1,101	6,181	244,237,709	32,755	33,150,704	16,765,125	45,739,144
1936.....	1,145	6,224	257,657,806	31,768	37,280,814	12,270,755	59,475,482
1937.....	1,144	6,271	273,578,624	37,144	43,199,558	15,319,093	67,042,550
1938.....							

Clay Products and Other Structural Materials

CLAY PRODUCTS

Brick, Tile and Sewer Pipe

1935.....	129	136	20,144,431	1,609	1,293,159	666,163	2,127,241
1936.....	129	136	19,487,227	1,651	1,397,395	747,183	2,506,008
1937.....	131	137	20,087,448	2,159	2,002,075	1,121,754	3,163,758
1938.....							

STONEWARE AND POTTERY

1935.....	3	3	357,575	119	94,765	13,415	205,744
1936.....	4	4	376,204	124	100,753	19,171	198,665
1937.....	6	6	339,784	128	92,717	14,569	216,778
1938.....							

TOTAL CLAY PRODUCTS*

1935.....	132	139	20,502,006	1,728	1,387,924	679,578	2,332,985
1936.....	133	140	19,863,431	1,775	1,498,148	766,354	2,704,673
1937.....	137	143	20,427,232	2,287	2,094,792	1,136,323	3,380,536
1938.....							

OTHER STRUCTURAL MATERIALS †

CEMENT

1935.....	4	9	52,454,004	924	1,027,416	1,621,674	3,958,369
1936.....	4	9	53,343,991	1,052	1,196,664	2,169,071	4,739,121
1937.....	4	9	54,150,672	1,083	1,373,444	2,445,333	6,650,534
1938.....							

(c) See footnote at end of this table.

(d) See footnote at end of this table.

*Includes kaolin and other clays.

†A considerable proportion of the values shown for lime and stone sales represents shipments for chemical purposes—see Chapter 9.

Table 22.—Principal Statistics of the Mineral Industry in Canada, by Industries, 1935-1937—Concluded

1	2	3	4	5	6	7	8
Year	Number of active firms	Number of operating mines, oil and gas wells, quarries, gravel pits, etc.	Capital employed (excluding ore reserves or other unmined material)	Number of employees	Salaries and wages	Cost of process supplies, purchased electricity and fuel also freight and smelter charges (d)	Net value of bullion, ore, concentrates, residues and other minerals shipped from the mines, smelters, brick and cement plants and quarries (c)
			\$		\$	\$	\$

OTHER STRUCTURAL MATERIALS†—Concluded

LIME

1935.....	49	54	5,707,391	756	556,049	810,437	2,115,354
1936.....	52	57	6,106,901	799	640,322	839,979	2,495,991
1937.....	52	57	4,931,831	872	781,274	1,038,958	2,785,959
1938.....							

SAND AND GRAVEL

1935.....	1,398	5,400	4,849,702	3,015	2,479,418	116,063	6,273,377
1936.....	1,356	5,374	2,994,127	3,638	2,090,388	101,059	6,820,340
1937.....	1,560	7,373	6,706,288	6,084	3,468,471	295,348	10,197,348
1938.....							

STONE

1935.....	372	496	12,277,518	2,475	1,950,698	734,339	4,573,224
1936.....	426	558	11,899,852	2,512	2,043,216	841,704	4,292,449
1937.....	418	555	12,857,537	2,898	2,576,344	1,085,548	5,853,812
1938.....							

TOTAL OTHER STRUCTURAL MATERIALS

1935.....	1,823	5,959	75,288,615	7,170	6,013,581	3,282,513	16,920,324
1936.....	1,838	5,998	74,344,871	8,001	5,970,590	3,951,813	18,347,901
1937.....	2,034	7,994	78,646,328	10,937	8,199,533	4,865,187	25,487,663
1938.....							

Total Clay Products and Other Structural Materials

1935.....	1,955	6,098	95,790,621	8,898	7,401,505	3,962,091	19,253,309
1936.....	1,971	6,138	94,208,302	9,776	7,468,738	4,718,167	21,052,574
1937.....	2,171	8,137	99,073,560	13,224	10,294,325	6,001,510	28,868,189
1938.....							

GRAND TOTAL OF ALL INDUSTRIES

1935.....	3,657	12,898	777,500,099	80,256	100,080,559	172,513,315	238,581,268
1936.....	3,941	13,229	859,063,095	90,999	116,766,222	205,360,362	291,972,359
1937.....	4,271	15,408	957,344,974	105,414	144,292,384	289,834,949	372,796,027
1938.....							

(c) The value of fuel, purchased electricity and process supplies used was deducted from the gross value of shipments for the first time in 1935; this was done in order to attain a more accurate approximation of a net value. Also the cost of ores, etc., treated in non-ferrous metallurgical plants is deducted in determining the figure "value added"; these costs were as follows: 1935, \$108,081,299; 1936, \$137,857,432; 1937, \$191,303,251. (d) The cost of freight and treatment charges was deducted by the shipper of metal bearing ores for all years prior to 1937; in 1937 the cost of freight and treatment charges was reported separately and deducted at the Bureau of Statistics, Ottawa.

NOTE.—The net value as given in column 8 represents the **gross value** as given by the operator less the cost of items indicated in column 7.

Table 22(a).—Principal Statistics of the Mineral Industry in Canada, by Provinces, 1935-1937

1 Year	2 Number of operating mines, oil and gas wells, quarries, gravel pits, etc.	3 Capital employed (excluding ore reserves or other unmined material) \$	4 Number of employees	5 Salaries and wages \$	6 Cost of process supplies, purchased electricity and fuel, also freight and smelter charges (b) (d) \$	7 Net value of bullion, ore, concentrates, residues and other minerals shipped from the mines, smelters, brick and cement plants and quarries (*) \$
(c) NOVA SCOTIA						
1935.....	267	53,569,182	14,550	14,301,510	7,758,899	14,207,064
1936.....	365	55,513,999	15,368	15,980,687	5,645,436	19,136,304
1937.....	1,210	59,114,458	15,629	18,373,958	6,076,253	22,597,547
1938.....						*
NEW BRUNSWICK						
1935.....	520	4,522,963	2,390	1,865,407	331,315	2,467,339
1936.....	423	5,253,829	14,225	1,248,431	242,114	2,324,747
1937.....	423	4,676,203	3,012	1,509,063	293,867	2,442,101
1938.....						
QUEBEC						
1935.....	3,850	117,534,858	11,811	12,794,600	39,781,783	33,679,150
1936.....	4,011	140,537,708	14,225	15,774,362	48,436,955	44,823,567
1937.....	5,120	181,868,872	19,121	22,708,131	67,723,503	60,872,828
1938.....						
ONTARIO						
1935.....	6,274	322,300,162	25,264	38,152,140	81,172,486	130,220,051
1936.....	6,297	384,535,666	31,105	46,899,805	108,353,709	151,874,462
1937.....	6,343	389,129,937	36,238	58,891,339	145,830,800	190,447,576
1938.....						
MANITOBA						
1935.....	119	40,944,700	2,346	3,403,649	9,720,167	9,040,591
1936.....	274	41,722,791	2,932	3,752,367	7,307,942	9,366,496
1937.....	275	55,815,784	3,159	4,301,366	14,293,086	13,415,841
1938.....						
SASKATCHEWAN						
1935.....	223	11,390,801	1,457	1,343,041	2,336,670	2,869,351
1936.....	219	14,974,371	1,828	1,937,825	3,826,763	5,720,747
1937.....	247	22,037,133	2,307	2,372,443	7,376,254	8,226,326
1938.....						
ALBERTA						
1935.....	585	102,656,116	9,706	10,862,198	4,876,482	16,738,472
1936.....	594	104,118,831	10,376	11,850,463	2,357,005	20,104,417
1937.....	637	110,055,642	10,843	12,924,934	2,819,959	20,988,638
1938.....						

Plants in the provinces do not add to Canada total, owing to the fact that a plant located on the Manitoba-Saskatchewan boundary is counted but once.

*See footnote, preceding table.

(b) Includes fuel and electricity used for metallurgical purposes.

(c) Statistics for Prince Edward Island included with Nova Scotia in 1936.

(d) See footnote, previous table.

Table 22(a). Principal Statistics of the Mineral Industry in Canada, by Provinces, 1935-1937—Concluded

1	2	3	4	5	6	7
Year	Number of operating mines, oil and gas wells, quarries, gravel pits, etc.	Capital employed (excluding ore reserves or other unmined material)	Number of employees	Salaries and wages	Cost of process supplies, purchased electricity and fuel, also freight and smelter charges (b) (d)	Net value of bullion, ore, concentrates, residues and other minerals shipped from the mines, smelters, brick and cement plants and quarries (*)
		\$		\$	\$	\$
BRITISH COLUMBIA						
1935.....	1,048	118,291,187	12,352	16,479,606	26,270,909	28,172,657
1936.....	1,029	103,483,250	12,827	17,908,553	28,553,612	36,694,755
1937.....	1,135	121,739,009	14,282	21,487,277	44,123,775	51,176,437
1938.....						
NORTHWEST TERRITORIES						
1935.....	6	531,292	47	69,341	19,629	(a) 105,176
1936.....	4	274,883	28	40,812	12,140	(a) 14,415
1937.....	8	2,114,300	132	221,181	113,221	(a) —(e)
1938.....						
YUKON						
1935.....	7	5,758,838	333	809,067	244,975	1,081,417
1936.....	14	8,647,767	566	1,372,917	624,686	1,912,449
1937.....	10	10,793,636	691	1,502,692	1,184,231	2,685,664
1938.....						
Canada						
1935.....	12,899	777,500,099	80,256	100,080,559	172,513,315	238,581,268
1936.....	13,230	859,063,095	90,999	116,766,222	205,360,362	291,972,359
1937.....	15,408	957,344,974	105,414	144,292,384	289,834,949	372,796,027
1938.....						

Plants in the provinces do not add to Canada total, owing to the fact that a plant located on the Manitoba-Saskatchewan boundary is counted but once.

*See footnote, preceding table.

(b) Includes fuel and electricity used for metallurgical purposes.

(d) See footnote, previous table.

(a) Value radium and uranium not included.

(e) N.W.T. showed a loss \$56,931 in 1937 owing to the fact that radium and uranium products are not included. This amount should be subtracted from the total net value by provinces to give the total net value for Canada.

Table 23.—Summary, by Nine Main Branches, of the Net Value of Production in Canada for 1935, 1936 and 1937 (†)

	1935	1936	1937	Percentage of total net value, 1937
	\$	\$	\$	%
Agriculture.....	617,867,000	679,341,000	678,953,000	22-86
Forestry.....	198,545,244	231,937,561	284,504,031	9-58
Fisheries.....	30,259,056	34,234,063	34,439,481	1-16
Trapping.....	8,877,331	9,214,325	10,477,096	0-35
Mining (Total).....	238,581,268	291,972,359	372,796,027	12-55
Auriferous Quartz.....	75,120,774	88,210,233	97,961,278	3-30
Other Mining.....	163,460,494	203,762,126	274,834,749	9-25
Electric Power.....	125,123,078	133,561,387	140,963,914	4-75
Construction.....	120,815,289	135,851,162	176,029,679	5-92
Custom and Repair.....	91,711,442	70,930,000	79,055,000	2-66
Manufactures, n.e.s.....	937,274,675	1,041,378,120	1,193,399,282	40-17
Grand Total (a).....	2,369,064,383	2,628,419,977	2,970,617,510	100-0
Manufactures, Total (a).....	1,150,899,283	1,289,592,672	1,506,624,867	50-73

†General Statistics Branch, Dominion Bureau of Statistics (Survey of Production Report).

(a) The difference between "manufactures, total" and "manufactures, n.e.s." is the amount of the duplication between primary and secondary industries. The sum of "manufactures, n.e.s." and the eight other main branches is regarded as the grand total.

Table 24.—Proportion Contributed by Mining to Total Net Value of Production in Each Province, 1936-1937

Province	1936		1937	
	Mining net	Percentage of net value provincial production	Mining net	Percentage of net value provincial production
	\$	%	\$	%
Prince Edward Island.....	27,663	0-22		
Nova Scotia.....	19,108,641	21-27	22,597,547	22-08
New Brunswick.....	2,324,747	3-66	2,442,101	3-45
Quebec.....	44,823,567	6-82	60,872,828	8-02
Ontario.....	151,874,462	12-83	190,447,576	14-43
Manitoba.....	9,366,496	7-62	13,415,841	7-65
Saskatchewan.....	5,720,747	3-68	8,226,326	10-98
Alberta.....	20,104,417	12-23	20,988,638	10-19
British Columbia—Yukon and N.W.T.....	38,621,619	17-84	53,805,170	21-28
Canada.....	291,972,359	10-95	372,796,027	12-55

Table 25.—Employees, Salaries and Wages in the Mineral Industry in Canada, by Provinces, 1937

Province	*Average number of employees				Salaries and wages		
	Salaried employees		Wage earners	Total†	Salaries	Wages	Total
	Male	Female			\$	\$	\$
Nova Scotia.....	549	65	15,015	15,629	1,108,112	17,265,846	18,373,958
New Brunswick.....	76	17	2,919	3,012	166,837	1,342,226	1,509,063
Quebec.....	1,672	144	17,305	19,121	3,066,850	19,641,281	22,708,131
Ontario.....	2,624	388	33,226	36,238	6,720,561	52,170,778	58,891,339
Manitoba.....	304	19	2,836	3,159	698,409	3,602,957	4,301,366
Saskatchewan.....	188	15	2,104	2,307	374,580	1,997,863	2,372,443
Alberta.....	833	109	9,901	10,843	1,792,318	11,132,616	12,924,934
British Columbia.....	1,273	131	12,875	14,282	3,093,187	18,394,090	21,487,277
Yukon.....	48	7	636	691	154,447	1,348,245	1,502,692
N.W.T.....	24		108	132	32,192	188,989	221,181
Canada.....	7,591	895	96,928	105,414	17,207,493	127,084,891	144,292,384

*The average number of wage-earners was obtained by adding the monthly figures for individual companies and dividing by 12 irrespective of the number of months worked, the average number of wage-earners in the industry, as in the previous year, is the sum of these individual averages.

†The data are not inclusive of all individuals or syndicates engaged exclusively in prospecting or general exploration.

Table 26.—Employees, Salaries and Wages in the Mineral Industry in Canada, by Industries, 1937

Industry	*Average number of employees				Salaries and wages		
	Salaried employees		Wage-earners	Total	Salaries	Wages	Total
	Male	Female					
METAL MINING					\$	\$	\$
Alluvial Gold Mines.....	81	11	977	1,069	179,027	1,510,884	1,689,911
Auriferous Quartz Mines.....	2,535	165	26,440	29,140	5,713,705	42,505,613	48,219,318
Copper-Gold-Silver Mines.....	434	28	4,702	5,164	1,094,864	7,145,750	8,240,614
Silver-Cobalt Mines.....	32	1	267	300	67,138	327,248	394,386
Silver-Lead-Zinc Mines.....	273	20	1,927	2,220	641,514	3,273,129	3,914,643
Nickel-Copper Mines.....	80	5	5,377	5,462	270,565	9,922,926	10,193,491
Miscellaneous Metal Mines.....	17	3	101	121	25,628	129,563	155,191
Non-ferrous Smelting and Refining.	862	141	10,567	11,570	2,575,849	15,415,098	17,990,947
NON-METAL MINING, INCLUDING FUELS							
Fuels							
Coal.....	1,196	116	25,890	27,202	2,635,318	29,006,361	31,641,679
Natural Gas.....	618	169	1,241	2,028	1,142,020	1,346,105	2,488,125
Petroleum.....	176	41	1,403	1,620	356,893	1,983,466	2,340,359
Other Non-Metal Mining							
Asbestos.....	280	41	3,521	3,842	522,213	3,710,294	4,232,507
Feldspar and Quartz (a).....	44	6	395	445	68,860	315,838	384,698
Gypsum.....	55	6	541	602	110,372	485,024	595,396
Iron Oxides.....	5	1	44	50	8,770	26,598	35,368
Mica.....	9		190	199	7,766	89,781	97,547
Salt.....	86	41	416	543	260,753	392,383	653,136
Talc and Soapstone.....	9	2	72	83	20,474	51,546	72,020
Miscellaneous.....	63	15	452	530	143,820	514,903	658,723
CLAY PRODUCTS AND OTHER STRUCTURAL MATERIALS							
Cement.....	94	6	983	1,083	211,778	1,161,666	1,373,444
Clay Products.....	232	29	2,026	2,287	471,891	1,622,901	2,094,792
Lime.....	64	10	798	872	108,195	673,079	781,274
Sand and Gravel.....	93	7	5,984	6,084	142,456	3,326,015	3,468,471
Stone.....	253	31	2,614	2,898	427,624	2,148,720	2,576,344
Total.....	7,591	895	96,928	105,414	17,207,493	127,084,891	144,292,384

*See footnote, preceding table.

†Includes pitchblende-silver mines.

(a) Includes nepheline-syenite mines.

Table 27.—Number of Wage-Earners in Canadian Mining Industry, in Month of Highest Employment during 1937 whose Regular (Normal) Hours, per Week, were:

(Does not include overtime)

	40 hours or less	41-43 hours	44 hours	45-47 hours	48 hours	49-50 hours	51-53 hours	54 hours	55 hours	56-59 hours	60 hours	Over 60 hours
By Provinces—												
Nova Scotia.....	2,163	16	2	3	14,582	113	25	306	17	364	168	190
New Brunswick.....	11	17	11	42	4,358	28	1	222		3	27	38
Quebec.....	601	77	271	153	16,081	344	332	3,216	225	1,321	1,501	1,284
Ontario.....	519	123	642	1,579	25,461	809	720	1,059	517	3,975	1,755	2,282
Manitoba.....	37		115	8	5,040	12	139	256	87	316	142	302
Saskatchewan.....	130	33	38	2	1,339	26	1,038	198	45	153	190	86
Alberta.....	2,056	28	267	235	10,120	150	31	388	25	599	57	24
British Columbia.....	3,132	62	281	44	9,294	114	706	78	79	1,830	41	36
Yukon.....					9		70		3	247		599
N.W.T.....							35	9		206	14	80
Canada.....	8,649	356	1,627	2,066	86,284	1,596	3,097	5,732	998	9,014	3,895	4,921
By Industries—												
METAL MINING—												
Alluvial Gold Mines.....	26		3		448		22	17		404	27	607
Auriferous Quartz Mines.....	148	100	20	483	18,110	541	1,719	2,528	269	5,535	510	2,334
Copper-Gold-Silver Mines.....	27	58	54	28	4,283		82	726	28	101	5	189
Silver-Cobalt Mines.....	3				199			55	3	42	2	14
†Silver-Lead-Zinc Mines.....	1		7		1,661	1	70	16	16	651	3	93
Nickel-Copper Mines.....	3			250	5,435	1		4		208	127	5
Miscellaneous Metal Mines.....	1				139					37	36	2
Non-Ferrous Smelting and Refining.....	2,899		202	788	7,032		3	207		265	7	9
Non-Metal Mining, Including												
Fuels—												
Coal.....	3,437	68	183	3	26,945	113	27	314	52	216	188	20
Natural gas.....	377	6	25	252	517	188	63	241	17	23	127	86
Petroleum.....	800	11	6	58	709	46	17	41	22	489	85	32
Other Non-Metal Mining—												
Asbestos.....					3,808			6			105	
Feldspar and Quartz.....	24	2	4	6	119	1	101	45	18	27	129	34
Gypsum.....	71	14	38	17	358	12	6	92	2	15	138	90
Iron Oxides.....					51				5		70	
Mica.....	43	7		17	72	66		45	8	10	12	
Salt.....	11	2	96	1	102	9	4	26	46	40	7	88
Talc and Soapstone.....	3	1			10			21	2		69	5
Miscellaneous.....	73	4	16	4	81	5	34	7	76	151	45	176
CLAY PRODUCTS AND OTHER STRUCTURAL MATERIALS—												
Cement.....	32		212	1	552	1	11	47		127	123	49
Clay Products.....	146	17	445	44	497	248	47	416	247	309	601	257
Lime.....	33		76	17	340	53	17	85	41	55	200	82
Sand and Gravel.....	69	2	15	1	13,674	13	819	204	53	33	311	270
Stone.....	422	64	225	96	1,142	298	55	589	93	276	968	429
Total.....	8,649	356	1,627	2,066	86,284	1,596	3,097	5,732	998	9,014	3,895	4,921

†Contains data on mining of silver-pitchblende ores in the Northwest Territories.

Table 28.—Employees and Salaries and Wages Paid in Canadian Mining Industry, 1921-1937

Year	Nova Scotia		New Brunswick		Quebec		Ontario		Manitoba		Saskatchewan	
	No.	\$	No.	\$	No.	\$	No.	\$	No.	\$	No.	\$
1921.....	14,129	16,476,653	930	1,009,042	6,312	6,113,673	14,265	16,712,006	803	764,299	794	726,943
1922.....	15,672	13,912,093	1,235	1,068,194	6,288	6,073,236	15,324	18,688,145	638	651,585	587	577,117
1923.....	15,280	17,613,514	1,334	1,339,229	7,124	7,446,475	17,978	23,469,827	629	680,183	738	760,392
1924.....	14,172	14,247,382	1,190	1,104,918	6,953	7,300,935	19,265	24,624,854	541	612,891	678	669,000
1925.....	9,905	12,488,285	1,113	1,003,169	8,700	8,566,616	19,346	25,909,951	699	711,735	652	647,014
1926.....	13,993	16,109,519	1,127	952,696	15,555	11,912,344	20,060	26,987,635	780	911,424	742	708,612
1927.....	15,663	18,076,122	1,196	1,092,891	18,012	15,104,472	21,147	28,753,161	1,007	1,232,805	1,112	855,704
1928.....	15,497	21,249,053	1,244	1,107,462	17,934	15,921,744	23,508	31,912,123	1,625	1,926,264	1,229	942,150
1929.....	14,738	21,035,230	1,361	1,236,726	19,678	16,886,275	24,924	34,897,624	1,819	2,375,990	1,421	1,139,373
1930.....	15,434	19,284,197	1,391	1,132,306	15,397	15,190,714	24,706	34,433,915	3,021	4,372,044	1,371	1,040,790
1931.....	14,871	15,302,444	1,197	1,048,860	11,141	12,666,586	20,277	30,470,475	2,059	3,096,332	1,092	896,131
1932.....	13,706	11,302,801	1,480	1,123,080	7,694	8,198,379	16,376	24,412,126	1,730	2,106,017	924	748,782
1933.....	13,915	9,852,765	1,629	1,402,114	8,629	8,621,984	17,309	25,600,168	1,379	1,847,251	1,265	1,111,001
1934.....	13,500	13,594,114	1,722	1,276,770	10,362	10,492,169	22,033	32,619,846	1,948	2,796,454	1,461	1,257,282
1935.....	14,550	14,301,510	2,390	1,865,407	11,811	12,794,600	25,264	38,152,140	2,346	3,403,649	1,457	1,343,041
1936.....	15,368	15,980,687	1,744	1,248,431	14,225	15,774,362	31,105	46,899,805	2,932	3,752,367	1,828	1,937,825
1937.....	15,629	18,373,958	3,012	1,509,063	19,121	22,708,131	36,238	58,891,339	3,159	4,301,366	2,307	2,372,443

Year	Alberta		British Columbia		Yukon		Northwest Territories		Canada	
	No.	\$	No.	\$	No.	\$	No.	\$	No.	\$
1921.....	11,590	19,201,199	11,465	17,403,814	466	754,011			60,804	79,161,640
1922.....	10,343	16,131,521	11,680	17,121,493	482	803,117			62,249	75,026,501
1923.....	11,295	19,306,818	12,105	19,913,678	469	804,761			66,952	91,334,877
1924.....	8,716	13,684,225	12,422	19,876,613	391	666,603			64,328	82,787,421
1925.....	10,486	13,808,354	13,727	21,440,904	462	527,090			65,090	85,103,118
1926.....	10,733	14,499,210	14,566	21,556,415	375	578,958			77,931	94,216,813
1927.....	11,205	15,699,304	15,031	22,714,957	301	691,476			84,674	104,220,892
1928.....	12,358	18,022,037	15,720	24,064,962	333	808,227			89,448	115,954,022
1929.....	13,824	19,915,537	16,882	26,073,143	455	930,613			95,102	124,490,511
1930.....	12,675	16,272,916	14,836	21,412,925	319	835,525			89,200	113,975,332
1931.....	10,579	11,357,722	11,297	16,345,887	296	784,862			72,509	91,969,299
1932.....	9,692	10,476,449	9,565	12,612,151	286	761,585	17	30,679	61,470	71,772,049
1933.....	9,057	9,463,382	9,845	11,455,946	233	545,692	76	131,502	63,334	70,031,805
1934.....	9,843	9,792,297	12,270	15,482,102	286	660,814	80	154,338	73,505	88,126,186
1935.....	9,706	10,862,198	12,352	16,479,606	333	809,067	47	69,341	80,256	100,080,559
1936.....	10,376	11,850,463	12,827	17,908,553	566	1,372,917	28	40,812	90,999	116,766,222
1937.....	10,843	12,924,934	14,282	21,487,277	691	1,502,692	132	221,181	105,414	144,292,384

Table 29.—Revised Estimates of British and Foreign Capital Invested in the Canadian Mining Industry and Grand Total of all British and Foreign Capital Invested in Canada, 1927-1937

(Internal Trade Branch)

(In millions of dollars)

Year	British	United States	Other Countries	Total British and Foreign Capital in mining	Total All External Capital in Canada
1927.....	99.0	197.0	3.0	299.0	6,184.3
1928.....	117.0	234.0	4.0	355.0	6,498.9
1929.....	120.0	239.0	4.0	363.0	6,835.7
1930.....	98.0	270.0	8.0	376.0	7,195.9
1931.....	93.0	254.0	8.0	355.0	7,067.8
1932.....	87.0	239.0	7.0	333.0	6,954.2
1933.....	87.0	241.0	7.0	335.0	6,913.9
1934.....	91.0	252.0	7.0	350.0	6,965.1
1935.....	85.0	234.0	7.0	326.0	6,897.5
1936.....	89.0	244.0	7.0	340.0	6,822.6
1937.....	90.0	257.0	10.0	357.0	6,765.0

Table 30.—Index Numbers of Employment by Industries (1926=100)

(General Statistics Branch)

NOTE.—The relative weight shows the proportion of employees reported in the indicated industry to the total number of employees reported in Canada by the firms reporting for Dec. 1, 1937.

—	Manu- factur- ing	Logging	All Mining	Metal Mining	Com- muni- cations	Trans- porta- tion	Construc- tion	Service	Trade	All Industries
1921—Average.....	87.7	103.0	98.0	56.1	90.2	94.1	71.1	83.6	92.7	88.8
1926—Average.....	99.6	99.5	99.7	99.4	99.6	99.7	99.2	99.5	99.2	99.6
1928—Average.....	110.1	114.5	114.4	127.0	108.2	105.9	118.8	118.1	116.1	111.6
1930—Average.....	109.0	108.0	117.8	145.6	119.8	104.6	129.8	131.6	127.7	113.4
1931—Average.....	95.3	60.1	107.7	138.7	104.7	95.8	131.4	124.7	123.6	102.5
1932—Average.....	84.4	42.6	99.2	133.1	93.5	84.7	86.0	113.6	116.1	87.5
1933—Average.....	80.9	66.5	97.5	143.8	89.9	79.0	74.6	106.7	112.1	83.4
1934—Average.....	90.2	124.7	110.8	179.4	79.1	80.3	109.3	115.1	117.9	96.0
1935—Average.....	97.1	126.9	123.3	218.8	79.8	81.2	97.8	118.2	122.1	99.4
1936—Average.....	103.4	138.7	136.5	256.0	81.0	84.1	88.2	124.5	127.5	103.7
1937—Jan. 1.....	102.4	242.1	145.6	270.5	80.7	81.4	61.2	124.8	136.9	103.8
Feb. 1.....	105.3	244.4	147.6	283.9	79.8	80.7	57.2	119.1	128.4	104.1
Mar. 1.....	107.6	193.3	145.8	280.6	80.8	79.6	52.8	118.9	126.1	102.8
April 1.....	110.8	132.5	146.0	290.7	81.4	79.5	53.7	122.7	127.5	103.0
May 1.....	113.8	86.7	147.4	296.5	82.9	85.1	71.4	125.2	128.4	106.3
June 1.....	117.9	109.1	151.9	308.4	85.6	86.7	105.2	129.0	131.5	114.3
July 1.....	119.0	125.0	153.6	312.9	88.0	89.4	128.5	137.5	133.4	119.1
Aug. 1.....	118.1	124.7	153.7	316.0	89.9	89.1	139.8	141.7	132.2	120.0
Sept. 1.....	121.2	143.4	159.1	319.6	90.9	89.7	144.5	146.6	130.9	123.2
Oct. 1.....	121.7	208.5	163.9	323.4	90.5	90.4	144.3	135.4	133.4	125.7
Nov. 1.....	119.0	306.3	161.1	320.4	88.9	87.2	131.7	131.0	137.0	125.2
Dec. 1.....	116.3	355.4	162.3	316.7	85.9	84.1	104.2	130.6	139.6	121.6
Average—1937.....	114.4	189.3	153.2	303.3	85.4	85.2	99.5	130.2	132.1	114.1
Relative weight of employment by industries as at Dec. 1, 1937	50.9	8.8	6.5	*3.4	2.0	8.7	10.7	2.5	9.9	100.0

*The average for the calendar year 1926, including figures up to Dec. 31, 1926, being the base used in computing these indexes, the average index here given for the 12 months Jan. 1 to Dec. 1, 1926, generally shows a slight variation from 100.

*Based on 37,017 employees and 219 mines.

Table 31.—Fuel and Electricity Used for all Purposes

Industry	Bituminous		Anthracite coal		Lignite coal	Coke	Gasoline	Kerosene
	Canadian	Imported	From United States	From other countries				
	Tons	Tons	Tons	Tons	Tons	Tons	Imp. gal.	Imp. gal.
METAL MINING								
Alluvial Gold..... Quantity	35	6			15	12	41,702	1,991
\$	2,576	200			100	1,222	16,732	1,166
Auriferous Quartz..... Quantity	11,714	23,007	1,918	1,057	464	339	819,179	30,551
\$	108,111	225,429	21,383	17,271	3,687	5,544	267,102	8,939
Copper-Gold-Silver..... Quantity	11,022	206	76	73	16,043	76	51,386	5,384
\$	87,851	3,132	935	1,600	41,537	1,547	16,758	1,552
Silver-Cobalt..... Quantity	1	1,101	102	172			9,628	90
\$	13	14,509	1,494	2,568			3,075	22
Silver-Lead-Zinc..... Quantity	43,794	5		2	196	4	95,087	20,236
\$	183,902	150		42	1,152	34	33,717	4,176
Nickel-Copper..... Quantity	3,198	3,530	105	95			17,230	2,362
\$	19,021	22,694	1,108	1,484			3,824	483
Miscellaneous Metals..... Quantity		1					2,421	420
\$		8					669	91
Non-Ferrous Smelting and Quantity	559,855	101,718	19	33		332,121	109,691	6,768
Refining..... \$	3,415,771	606,457	286	521		3,323,798	21,951	1,407
Total..... Quantity	629,619	129,574	2,220	1,432	16,718	332,552	1,146,324	67,802
 \$	3,817,245	872,579	25,206	22,486	46,476	3,332,145	363,828	17,836
NON-METAL MINING, INCLUDING								
<i>Fuels</i>								
Coal..... Quantity	650,027				65,597		104,918	1,917
\$	1,943,470				65,516		28,964	502
Natural Gas..... Quantity	190						44,761	
\$	1,025						9,414	
Petroleum..... Quantity	2,492				841		34,901	1,217
\$	13,512				2,995		6,612	314
Total..... Quantity...	652,709				66,438		184,580	3,134
 \$	1,958,007				68,511		44,990	816
<i>Other Non-Metal Mining</i>								
Asbestos..... Quantity	36,995		14,026	10,999		38	81,687	6,187
\$	256,047		104,577	82,052		454	17,851	1,081
Feldspar, nepheline sye- Quantity	1,186	3,785		2		9	66,145	987
nite and Quartz..... \$	8,009	23,248		30		120	14,007	191
Gypsum..... Quantity	6,366	1,208			1,060	351	98,112	884
\$	36,792	7,630			4,047	3,666	21,673	178
Iron Oxides..... Quantity				41			1,080	40
\$				480			246	8
Mica..... Quantity	251						3,790	5
\$	2,255						966	1
Salt..... Quantity		23,607		3,812	7,503	26	2,918	250
\$		106,106		17,059	25,471	210	517	63
Talc and Soapstone..... Quantity	145						2,387	25
\$	1,016						481	6
Miscellaneous..... Quantity	16,314	2,446		12	5,690	88	75,375	1,525
\$	97,399	12,049	103	180	14,417	636	16,004	300
Total..... Quantity...	61,867	31,046	14,033	14,866	14,253	512	331,494	9,903
 \$	401,618	149,033	104,680	99,801	43,935	5,086	71,745	1,828
STRUCTURAL MATERIALS AND CLAY PRODUCTS								
Cement..... Quantity	145,791	90,925					108,493	2,418
\$	760,766	513,417					20,713	462
Clay Products..... Quantity	26,197	83,241	1,067	283	1,552	506	52,337	3,235
\$	153,285	555,462	9,153	2,357	3,156	4,558	11,264	779
Lime..... Quantity	37,588	67,647			84	12,211	38,923	1,590
\$	224,911	339,817			311	59,698	8,665	189
Sand and Gravel..... Quantity	6,326	11,306	310				236,194	2,673
\$	38,431	68,604	2,294			30	51,842	1,020
Stone..... Quantity	3,192	11,264	202	90		250	355,824	3,306
\$	24,056	73,905	1,339	935		2,099	83,631	630
Total..... Quantity	219,094	264,383	1,690	373	1,636	12,970	791,771	13,222
 \$	1,201,441	1,551,205	13,405	3,292	3,467	96,415	176,115	3,080
Grand Total..... Quantity	1,562,679	425,003	17,943	16,671	99,045	346,034	2,454,169	94,061
 \$	7,378,219	2,572,817	143,291	126,579	162,389	3,433,646	656,678	23,560

+ Explosives, chemicals, etc. (a) On outgoing shipments only. (b) Paid by mine operator only. (c) In addition cost of ores, etc., treated totalled \$191,303,251. (d) Data not available. (e) Cost includes service charges.

in the Mineral Industry in Canada, by Kinds and Industries, 1937

Fuel oil and diesel oil	Wood	Gas		Other fuel	Electricity purchased (c)	Total	Electricity generated for own use	Electricity generated for sale	Process supplies †	Freight (a)	Treatment charges (b)
		Manu- factured	Natural								
Imp. gal.	Cords	M cu. ft.	M cu. ft.	\$	K.W.H.	\$	K.W.H.	K.W.H.	\$	\$	\$
217,944	5,583						23,261,542	3,875,413			
41,755	35,321					99,072		25,720	77,488	(d)	(d)
6,209,842	142,341				629,083,378		66,250,390	839,720			
978,572	668,476			9,196	5,031,691	7,345,401		3,908	16,230,722	480,090	658,614
717,632	2,453				199,045,597						
58,376	13,261				674,539	901,088	48,263,031		4,851,845	344,818	9,735,199
9,563	641				6,704,645						
1,293	4,377				62,753	90,134			116,455	29,202	76,833
1,112,108	1,910				60,545,034		15,300,969				
287,633	26,632			11	308,449	845,895			1,940,177	1,860,860	1,141,450
137,387	321				106,712,921		7,000				
13,477	1,315				322,416	385,822			4,799,407	(d)	(d)
27,456	2,668				332,650						
4,622	6,884				3,394	15,668			17,466	251	
20,479,957	16,930	29,949	119	2,365,623,676	3,394		239,262,152				
1,109,770	78,648	4,489	96	5,076	6,039,151	14,607,421			10,559,714	(c)	
28,911,889	172,847	29,949	119		3,368,047,901		392,345,084	4,715,133			
2,495,498	834,914	4,489	96	14,283	12,442,423	24,290,504		29,628	38,593,274	2,715,221	11,612,096
19,433					120,253,047		48,270,118	12,172,174			
3,104					1,538,722	3,580,278		186,894	5,137,433		
1,230			179,784		15,545						
141			64,828		282	75,690			23,190		
784,547	1,317	2,400	5,328,756		1,711,507						
54,198	4,629	398	362,350		26,179	471,187			638,779		
808,210	1,317	2,400	5,508,540		121,980,099		48,270,118	12,172,174			
57,443	4,629	398	427,178		1,565,183	4,127,155		186,894	5,799,402		
45,469	20				136,454,898				2,729,801		
5,013	10				879,349	1,346,434					
226,786	350				1,260,653		1,376,313				
20,045	1,192				15,769	82,611			103,859		
93,164	399		25,836		3,917,621		1,046,152		106,962		
9,738	2,010		10,342		60,039	156,115					
	3,032				140,000				510		
	10,010				2,624	13,368					
	164								13,778		
	546					3,768					
169,043					2,754,560		4,054,875				
16,398					17,293	183,117			75,947		
3,774	22				1,594,310						
470	44				17,301	19,318			6,076		
2,318,527	1,895	14	256,036		3,990,380		1,282,840				
120,291	6,189	14	26,778		27,559	321,919			228,953		
2,854,763	5,912	14	281,872		150,112,422		7,760,180				
171,955	20,001	14	37,120		1,019,834	2,126,650			3,265,886		
15,982	61				61,045,600				540,915		
1,863	228				606,969	1,904,418					
39,029	31,177		878,235		10,315,203		265,604		103,568		
4,034	116,899		29,672	686	141,420	1,032,755					
550,554	46,078				8,604,644		556,628		167,827		
24,060	134,499				48,358	871,131					
39,348	65		15,718		6,006,286				63,179		
4,142	253		6,393		59,160	232,169					
173,974	7,093				18,807,394		1,317,300		613,542		
20,134	13,022				252,255	472,006					
818,887	84,474		893,951		104,779,127		2,139,532				
54,233	264,901		36,065	690	1,108,162	4,512,479			1,489,031		
33,390,749	264,550	32,363	6,684,482		3,741,919,549		450,514,914	16,887,307			
2,779,129	1,124,445	4,901	500,459	14,973	16,135,702	35,056,788		216,522	49,147,593	2,715,221	11,612,096

Table 32.—Fuel and Electricity Used for all Purposes

Province	Bituminous		Anthracite coal		Lignite coal	Coke	Gasoline	Kerosene
	Canadian	Imported	From United States	From other countries				
	Tons	Tons	Tons	Tons	Tons	Tons	Imp. gal.	Imp. gal.
Nova Scotia.....Quantity	443,056			1		3,698	136,412	6,286
\$	1,454,525			16		19,149	31,206	947
New Brunswick.....Quantity	11,551	9					25,719	
\$	47,434	136					5,434	
Quebec.....Quantity	278,104	38,482	15,308	11,605		2,868	620,376	17,895
\$	1,823,323	260,949	116,283	89,966		27,855	160,881	4,556
Ontario.....Quantity	363,101	386,055	2,620	4,956	56	277,402	1,042,804	32,458
\$	2,110,986	2,305,337	26,518	33,763	771	2,826,162	248,452	8,227
Manitoba.....Quantity	50,199	288	1		8,783	149	149,187	2,593
\$	380,955	3,478	16		30,301	1,862	52,896	811
Saskatchewan.....Quantity	23,013	33			36,609	11	118,764	2,136
\$	159,711	619			49,312	180	38,736	525
Alberta.....Quantity	131,501				36,974		50,450	4,886
\$	372,304				36,614		15,216	1,242
British Columbia.....Quantity	262,091	136	14	109	16,623	61,899	279,961	25,734
\$	1,024,367	2,298	474	2,834	45,391	557,216	83,119	5,867
Yukon.....Quantity	50					12	12,891	1,893
\$	3,758					1,222	9,579	1,272
N.W.T.....Quantity	13						17,605	180
\$	856						11,159	113
Canada.....Quantity	1,562,679	425,003	17,943	16,671	99,045	346,034	2,454,169	94,061
\$	7,378,219	2,572,817	143,291	126,579	162,389	3,433,646	656,678	23,560

(a) On outgoing shipments and paid by mine operator.

(b) Paid by mine operator only.

Table 33.—Fuel and Electricity Used only for Metallurgical Purposes

Province	Bituminous coal		Anthracite coal		Lignite coal	Coke
	Canadian	Imported	From United States	From other Countries		
	Tons	Tons	Tons	Tons	Tons	Tons
Quebec.....Quantity	103,125	42				2,417
\$	794,363	286				24,003
Ontario.....Quantity	318,301	75,466				267,644
\$	1,841,642	445,331				2,741,408
Manitoba.....Quantity	29,880					
\$	221,300					
Saskatchewan.....Quantity	14,717					
\$	108,998					
British Columbia.....Quantity	85,885					61,715
\$	409,622					554,887
Canada.....Quantity	551,908	75,508				331,776
\$	3,375,925	445,617				3,320,298

* All used in the non-ferrous smelting and refining industry and included in table 29.

in the Mineral Industry in Canada, by Provinces, 1937

Fuel oil and diesel oil	Wood	Gas		Other fuel	Electricity purchased (e)	Total	Electricity generated for own use	Electri- city generated for sale	Process supplies †	Freight (a)	Treat- ment charges (b)
		Manu- factured	Natural								
Imp. gal.	Cords	M cu. ft.	M cu. ft.	\$	K.W.H.	\$	K.W.H.	K.W.H.	\$	\$	\$
848,102 87,376	3,772 13,066		256,036 26,778		87,900,794 1,155,695	2,788,758	31,702,463	8,643,504 90,158	3,282,720		4,775
	12,921 43,946		32,299 15,858		1,746,894 34,765	147,573	604,152		146,162	132	
5,774,541 473,630	77,908 324,653	29,199 2,989		6,608	1,382,337,689 4,832,752	8,124,445	239,050,071		10,081,247	342,819	5,355,795
18,028,426 1,251,305	109,280 456,864	764 1,514	199,300 70,467	7,576	1,200,970,071 6,081,573	15,429,515	27,112,421		23,688,278	47,427	86,600
350,689 68,381	18,228 85,445				213,563,392 352,822	976,967	10,142,601	839,720 3,908	2,038,162	46,122	2,384,490
2,403,181 138,790	5,410 31,937				96,206,117 115,411	535,221	2,390,308		902,269	1,621	1,108,355
786,156 54,767	1,941 7,102	900 63	6,196,847 387,356		29,801,793 355,673	1,230,337	10,157,350	612,235 47,782	1,589,622		
4,727,427 467,388	31,146 108,760			789	732,392,799 3,207,011	5,505,514	106,795,111	2,933,230 50,113	6,942,254	2,016,518	2,430,548
435,172 224,825	2,827 38,724					279,380	22,537,812	3,858,618 24,561	402,736	260,532	241,533
37,055 12,667	1,117 13,948	1,500 335				39,078	22,625		74,143		
33,390,749 2,779,129	264,550 1,124,445	32,363 4,901	6,684,482 500,459	14,973	3,744,919,549 16,135,702	35,056,788	450,514,914	16,887,307 216,522	49,147,593	2,715,221	11,612,096

in the Mineral Industry of Canada by Provinces, 1937*

Gasolene	Kerosene	Fuel oil and diesel oil	Wood	Gas		Other fuel	Electricity purchased	Total	Electricity generated for own use
				Manu- factured	Natural				
Imp. gal.	Imp. gal.	Imp. gal.	Cords	M cu. ft.	M cu. ft.	\$	K.W.H.	\$	K.W.H.
7,403 2,082	1,263 301	3,891,159 205,766	5,300 21,100	29,199 2,989			924,636,995 1,802,714	2,853,604	210,455,752
6,606 1,563	3,015 603	15,371,244 765,022	10,959 53,696	750 1,500	119 96	5,076	201,310,499 605,965	6,461,902	
			67 311				89,242,000 64,575	286,186	
			33 154				44,621,000 31,806	140,958	
		1,046,832 121,648	571 3,387					1,089,544	
14,009 3,645	4,278 904	20,308,735 1,092,436	16,930 78,648	29,949 4,459	119 96	5,076	1,259,810,494 2,505,060	10,832,194	210,455,752

DOMINION BUREAU OF STATISTICS

Table 34.—Power Equipment in Use, and Power Equipment in
ORDINARILY IN USE

Province	Steam engines and turbines	Diesel engines	Gasolene, gas and oil engines other than diesel engines	Hydraulic turbines or water wheels	Total primary power	Electric motors run by purchased power	Total power employed	Electric motors run by primary power in same plant	Boilers
Nova Scotia..... No.	58	34	65	1	153	724	882	222	117
H.P.	49,220	4,730	2,554	500	57,004	53,154	110,158	11,758	32,800
New Brunswick... No.	24	.....	38	1	63	158	221	22	22
H.P.	1,573	.....	1,190	75	2,838	1,616	4,454	10	1,089
Quebec..... No.	67	52	177	15	311	5,177	5,488	242	117
H.P.	6,007	8,436	5,548	52,285	72,276	177,967	250,243	9,420	11,966
Ontario..... No.	209	121	435	5	770	8,721	9,491	1,006	276
H.P.	15,133	13,060	14,722	1,150	44,065	352,651	396,716	14,406	29,336
Manitoba..... No.	21	11	37	4	73	1,355	1,428	167	38
H.P.	707	1,890	1,250	2,200	6,047	68,081	74,128	3,004	4,215
Saskatchewan... No.	38	14	45	.....	97	533	630	21	21
H.P.	2,865	1,524	1,112	.....	5,501	28,829	34,330	2,154	3,182
Alberta..... No.	247	4	101	.....	352	1,200	1,552	366	309
H.P.	33,588	20	2,725	.....	36,333	40,485	76,818	10,319	39,422
British Columbia. No.	107	102	110	73	392	3,823	4,215	948	102
H.P.	31,693	11,647	3,172	36,002	82,514	180,701	263,215	37,095	18,951
Yukon..... No.	3	15	3	.....	21	.....	21	302	3
H.P.	45	2,316	60	.....	2,421	.....	2,421	17,422	48
N.W.T..... No.	.....	6	11	.....	17	.....	17	10	4
H.P.	.....	434	175	.....	609	.....	609	36	135
Canada..... No.	774	359	1,022	99	2,254	21,691	23,945	3,563	1,009
H.P.	140,831	44,057	32,508	92,212	309,608	903,484	1,213,092	105,856	141,144

Table 35.—Power Equipment in Use, and Power Equipment in
ORDINARILY IN USE

Industry	Steam engines and turbines	Diesel engines	Gasolene, gas and oil engines other than diesel engines	Hydraulic turbines or water wheels	Total primary power	Electric motors run by purchased power	Total power employed	Electric motors run by primary power in same plant	Boilers
METAL MINING—									
Alluvial Gold Mines..... No.	9	14	40	7	70	.....	70	280	5
H.P.	269	1,690	934	408	3,301	.....	3,301	18,386	172
Auriferous Quartz Mines..... No.	77	207	174	41	499	6,232	6,731	1,130	228
H.P.	3,581	26,618	5,879	16,089	52,167	191,797	243,964	18,996	17,465
Copper-Gold-Silver Mines..... No.	7	3	11	7	28	2,030	2,058	275	23
H.P.	10,116	800	356	9,300	20,572	108,340	128,912	18,582	4,607
Silver-Cobalt Mines..... No.	.....	.....	4	.....	4	48	52	.....	3
H.P.	.....	.....	9	.....	9	1,730	1,739	.....	200
Silver-Lead-Zinc Mines..... No.	3	49	20	7	79	683	762	251	18
H.P.	6,000	5,663	600	825	13,088	21,095	34,183	3,988	3,037
Nickel-Copper Mines..... No.	3	1	1	2	7	534	541	2	6
H.P.	90	153	1	720	964	39,526	40,490	9	575
Miscellaneous Metal Mines..... No.	1	2	6	.....	9	15	24	.....	2
H.P.	25	182	134	.....	341	285	626	.....	135
Non-ferrous Smelting and Refining..... No.	24	.....	10	11	45	5,512	5,557	585	32
H.P.	9,151	.....	455	51,125	60,731	264,824	325,555	7,950	18,943
Total..... No.	124	276	266	75	741	15,054	15,795	2,523	317
H.P.	29,232	35,106	8,368	78,467	151,173	627,597	778,770	67,911	45,134

Reserve or Idle, in the Mineral Industry in Canada, by Provinces, 1937

IN RESERVE OR IDLE

Steam engines and turbines	Diesel engines	Gasolene, gas and oil engines other than diesel engines	Hydraulic turbines or water wheels	Total primary power	Electric motors run by purchased power	Total power employed	Electric motors run by primary power in same plant	Boilers
12	9	12		38	14	47	12	11
4,487	347	557		5,391	358	5,749	960	2,249
5		3		8	4	12		5
167		55		222	143	365		145
13	8	56		77	269	346	31	40
841	1,214	2,688		4,743	12,385	17,128	461	3,793
31	6	60		97	555	652	128	48
2,453	685	2,506		5,644	25,379	31,023	3,235	3,753
10	3	18		31	83	114	4	12
2,305	770	1,379		4,454	2,180	6,634	53	1,197
4	2	7		13	34	47	6	7
1,375	350	545		2,270	1,074	3,344	63	1,333
33		11		44	12	56	6	13
7,553		255		7,808	363	8,171	140	1,510
13	29	22	15	79	581	660	98	25
2,617	2,587	421	1,488	7,113	14,577	21,690	2,137	2,629
4	1	4		9		9	6	2
70	110	65		245		245	225	180
	4			4		4	38	2
	722			722		722	261	90
125	62	193	15	395	1,552	1,947	329	165
21,868	6,785	8,471	1,488	38,612	56,459	95,071	7,535	16,879

Reserve or Idle, in the Mineral Industry in Canada, by Industries, 1937

IN RESERVE OR IDLE

Steam engines and turbines	Diesel engines	Gasolene, gas and oil engines other than diesel engines	Hydraulic turbines or water wheels	Total primary power	Electric motors run by purchased power	Total power employed	Electric motors run by primary power in same plant	Boilers
6	3	5	1	15		15		1
101	34	47	30	212		212		8
25	40	82	7	154	421	575	159	65
1,413	4,444	4,795	1,148	11,800	12,034	23,834	3,492	4,146
6	4	23		33	119	152	31	10
3,225	452	1,598		5,275	3,204	8,479	1,207	1,290
3				3		3		2
235				235		235		100
	10	8		18	123	141	57	3
	1,210	152		1,362	5,157	6,519	900	222
					25	25		
					1,809	1,809		
		1		1	3	4		2
		30		30	85	115		70
3				3	613	616	51	4
1,134				1,134	23,216	24,350	621	1,907
43	57	119	8	227	1,304	1,531	298	87
6,108	6,140	6,622	1,178	20,048	45,505	65,553	6,220	7,743

Table 35.—Power Equipment in Use, and Power Equipment in
ORDINARILY IN USE

Industry	Steam engines and turbines	Diesel engines	Gasolene, gas and oil engines other than diesel engines	Hydraulic turbines or water wheels	Total primary power	Electric motors run by purchased power	Total power employed	Electric motors run by primary power in same plant	Boilers
Non-Metal Mining, INCLUDING FUELS—									
<i>Fuels</i>									
Coal.....No.	306	2	114	2	424	2,052	2,476	568	308
H.P.	83,772	160	2,116	12,000	98,048	91,796	189,844	29,769	58,182
Natural Gas.....No.	17		201		218	25	243	13	14
H.P.	553		5,863		6,416	674	7,090	202	600
Petroleum.....No.	92		72		164	88	252	39	160
H.P.	12,918		2,615		15,533	565	16,098	948	21,710
Total.....No.	415	2	387	2	806	2,165	2,971	620	482
H.P.	97,243	160	10,594	12,000	119,997	93,035	213,032	30,919	80,492
<i>Other Non-Metal Mining</i>									
Asbestos.....No.	7		3		10	1,066	1,076		8
H.P.	235		107		342	50,759	51,101		410
Feldspar, nepheline- syenite & Quartz.....No.	5	5	22		32	55	87	77	35
H.P.	535	657	931		2,123	1,035	3,158	495	954
Gypsum.....No.	6	15	42		63	161	224	13	6
H.P.	810	1,806	2,229		4,845	5,782	10,627	309	885
Iron oxides.....No.						6	6		1
H.P.						76	76		30
Mica.....No.	2	1	6	1	10		10	3	1
H.P.	50	40	146	145	331		381	115	50
Salt.....No.	27	3	1		31	52	83	130	7
H.P.	2,438	555	10		3,003	468	3,471	1,421	3,300
Talc and Soap- stone.....No.		1	6		7	21	28		
H.P.		25	36		61	648	709		
†Miscellaneous.....No.	3	5	16	2	26	114	140	84	5
H.P.	450	660	452	150	1,712	2,459	4,171	1,100	450
Total.....No.	50	30	96	3	179	1,475	1,654	307	63
H.P.	4,518	3,743	3,911	295	12,467	61,227	73,694	3,440	6,079
CLAY PRODUCTS AND OTHER STRUCTURAL MATERIALS—									
Cement.....No.	1	2	32		35	1,230	1,265	10	11
H.P.	7	535	1,479		2,021	69,964	71,985	756	392
Clay Products.....No.	61	9	42		112	492	604	20	64
H.P.	4,070	725	1,050		6,745	14,640	21,385	351	5,509
Lime.....No.	8	4	13		25	282	307	43	17
H.P.	260	376	395		1,031	5,492	6,523	549	1,192
Sand and Gravel.....No.	15	6	48	7	76	183	259	3	4
H.P.	487	580	1,843	240	3,160	7,299	10,449	220	170
Stone.....No.	100	30	138	12	280	810	1,090	37	51
H.P.	4,114	2,832	4,868	1,210	13,024	24,230	37,254	1,710	2,176
Total.....No.	185	51	273	19	528	2,997	3,525	113	147
H.P.	9,938	5,048	9,635	1,450	25,971	121,625	147,596	3,586	9,439
Grand total 1937...No.	774	359	1,022	99	2,254	21,691	23,945	3,563	1,009
H.P.	140,831	44,057	32,508	92,212	309,608	903,484	1,213,092	105,856	141,144
Grand total 1936...No.	743	245	969	166	2,123	18,621	20,744	3,104	953
H.P.	125,031	33,967	30,333	98,531	287,862	783,767	1,071,629	87,462	137,502

†Includes data for peat.

Reserve or Idle, in the Mineral Industry in Canada, by Industries, 1937 Concluded
IN RESERVE OR IDLE

Steam engines and turbines	Diesel engines	Gasolene, gas and oil engines other than diesel engines	Hydraulic turbines or water wheels	Total primary power	Electric motors run by purchased power	Total power employed	Electric motors run by primary power in same plant	Boilers
47		12		59	28	87	11	29
13,915		333		14,248	864	15,112	937	5,286
1		10		11		11		
35		227		262		262		
2		4		6	5	11		9
51		27		78	26	104		750
50		26		76	33	109	11	38
14,001		587		14,588	890	15,478	937	6,036
		2		2	29	31		3
		10		10	3,087	3,097		195
1	1	8		10	3	13	5	2
25	300	203		528	100	628	13	48
1		3		4	43	47	2	2
30		143		173	1,475	1,648	85	170
		1		1		1		
		30		30		30		
								1
								25
3	2	3		8	3	11	5	6
75	45	19		139	46	185	100	650
		3		3	4	7		
		15		15	90	105		
1	1	2		4	6	10	6	2
200	225	105		530	335	865	63	500
6	4	22		32	88	120	18	16
330	570	525		1,425	5,133	6,558	291	1,688
2		3		5	19	24		3
50		147		197	1,117	1,314		64
2	1	10		13	43	56	1	7
135	75	198		408	1,988	2,396	110	580
1				1	14	15	1	1
25				25	485	510	7	75
1		3		4	3	7		1
12		175		187	90	277		85
20		10	7	37	48	85		12
1,207		217	310	1,734	1,251	2,985		708
26	1	26	7	60	127	187	2	24
1,429	75	737	310	2,551	4,931	7,482	117	1,512
125	62	193	15	395	1,552	1,947	329	165
21,868	6,785	8,471	1,488	38,612	56,459	95,071	7,535	16,879
143	57	170	27	397	1,563	1,960	172	151
24,295	5,238	7,200	7,523	44,246	64,114	108,360	3,437	15,656

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Table 36.—Mining Accidents in 1937

Cause of Accident	Nova Scotia		New Brunswick		Quebec		Ontario		Saskatchewan		Alberta		British Columbia		Canada	
	Fatal	Non-Fatal	Fatal	Non-Fatal	Fatal	Non-Fatal	Fatal	Non-Fatal	Fatal	Non-Fatal	Fatal	Non-Fatal	Fatal	Non-Fatal	Fatal	Non-Fatal
UNDERGROUND—																
Falls of roof or face.....	15	525	.....	105	6	167	9	118	.....	47	10	62	11	407	51	1,431
Mine cars and locomotives.....	12	388	.....	93	.....	114	2	202	.....	40	2	36	3	140	19	1,013
Gas and dust explosions.....	.....	1	.....	.....	.....	.....	.....	.....	.....	.....	1	5	.....	13	1	19
Explosives.....	1	3	1	10	6	16	6	38	.....	.....	.....	.....	3	14	17	81
Electricity.....	.....	.....	.....	1	.....	2	.....	.....	1	.....	.....	.....	.....	2	.....	6
Miscellaneous.....	1	943	.....	79	7	599	19	1,377	.....	103	4	23	12	1,406	43	4,530
Total.....	29	1,860	1	288	19	898	36	1,735	.....	191	17	126	29	1,962	131	7,080
SURFACE—																
Haulage.....	.....	35	.....	16	2	145	.....	45	.....	27	1	2	.....	34	3	304
Machinery.....	.....	19	.....	6	3	256	3	82	.....	9	.....	4	2	21	8	397
Miscellaneous.....	.....	213	.....	28	11	621	13	859	1	47	2	13	1	306	28	2,087
Total.....	.....	267	.....	50	16	1,022	16	986	1	83	3	19	3	361	39	2,788
Grand Total.....	29	2,127	1	338	35	1,920	52	2,721	1	274	20	145	32	2,343	170	9,868

Table 37.—Purchases of Mining and Milling Equipment, General Supplies, and Freight and Insurance Expenditures, by the Base Metal Mining, Smelting and Refining Industries in Canada, 1937

This survey includes the purchases by the Copper-Gold-Silver Mining, Smelting and Refining Industry; Silver-Lead-Zinc Mining, Smelting and Refining Industry; Silver-Cobalt Mining and Smelting Industry; Nickel-Copper Mining, Smelting and Refining Industry; Silver-Radium Mining Industry.

	Nova Scotia and Quebec	Ontario	Manitoba and Saskatchewan	British Columbia, Yukon and Northwest Territories	Canada
	\$	\$	\$	\$	\$
Belting of all kinds, including elevator, conveyor, transmission, etc., and fasteners for same.....	96,616	92,938	14,475	68,219	272,248
Bolts, nuts, rivets, studs, washers, coach, set and machine screws, etc.....	29,729	90,632	24,049	71,832	216,242
Castings—unfinished iron and steel.....	27,890	294,914	28,332	44,740	395,876
Unfinished brass castings; brass and copper rods and sheets, babbitt and non-ferrous metals of all kinds....	22,818	122,891	133,655	221,232	500,596
Cars and locomotives and mechanical parts for same....	49,215	241,372	41,647	61,476	393,710
Track materials—rails and fittings, switches, spikes, bolts, etc.....	54,920	227,461	28,541	61,099	372,021
Explosives—powder, fuse and detonators.....	388,444	983,632	307,456	623,826	2,303,358
Rock drills and parts.....	105,661	257,898	93,912	132,788	590,259
Drill and tool steels.....	65,353	245,933	47,191	78,546	437,023
Pipe and fittings, plumbing supplies and valves.....	221,543	521,527	108,425	365,773	1,217,268
Iron and steel bars, sheets, plates and all structural steel.	146,403	904,571	109,090	498,465	1,658,529
Wire rope and fittings.....	38,172	151,259	41,715	38,162	269,308
Diamonds and bort for drilling.....	24,899	15,373	1,275	6,752	48,299
Safety equipment and apparel—safety hats, boots, gloves, goggles, respirators, etc.; miners' lamps and accessories and lamp rentals.....	19,986	145,913	14,001	66,189	246,089
Fuel—coal, coke, charcoal and wood.....	860,023	5,464,562	387,310	1,366,324	8,078,219
Fuel oil, kerosene and gasoline.....	197,421	857,750	13,110	517,681	1,585,962
Lubricants—oil, grease and waste.....	34,523	114,056	31,098	102,605	282,282
Lumber and timber of all kinds.....	200,079	2,544,158	137,963	345,406	3,227,606
Building materials—cement, brick, tile, roofing and building paper, insulating material, building hardware, glass, putty, paints, varnishes and brushes, wood screws, nails, screw hooks and eyes, sand, lime, and miscellaneous.....	120,878	1,203,542	64,124	274,786	1,663,330
Electrical equipment and supplies—motors, batteries, wire and cable, etc.....	392,633	889,014	399,948	476,079	2,157,674
Crushing, grinding and screening machinery and parts—ball and tube mill liners, roll shells, etc.....	225,752	323,274	95,708	249,558	894,292
Filter cloth, rotor covers and ore dressing blankets.....	21,941	97,186	25,060	51,689	195,876
Balls and rods for grinding.....	193,015	202,930	103,685	166,431	666,061
Machinery, mill, n.o.p., and parts.....	219,671	285,284	135,439	110,831	751,225
Machinery, mine, n.o.p., and parts—steel shop equipment, hoists, mine pumps, etc.....	252,760	428,458	132,653	97,716	911,587
Machinery, smelter, n.o.p., and parts.....	125,597	1,168,676	23,850	536,238	1,854,361
Machinery, miscellaneous, and parts—machine shop, blacksmith, carpenter shop and general surface equipment.....	118,856	253,179	61,118	120,960	554,113
Motor cars, trucks and accessories.....	37,626	23,401	6,569	121,481	189,077
Tools—brooms, picks, shovels, hammers, handles, saws, wrenches, machinists' tools, etc.....	35,441	127,672	27,543	57,671	248,327
Welding and cutting equipment and accessories—oxygen, acetylene welding, rods, tips, etc.....	25,260	133,849	30,680	44,962	234,751
Rubber goods, suits, boots hose and accessories, pump valves, launder linings, etc. (not including belts).....	53,981	102,019	33,936	114,629	304,565
Flotation reagents.....	360,619	398,206	186,749	297,673	1,243,247
Cyanide and cyanide plant chemicals.....	66,788	6,012	264,000	51,193	387,993
Acids and chemicals, n.o.p.....	105,736	348,366	39,000	46,876	539,978
Refractories—brick, cement, fireclay, etc.....	190,367	951,564	96,688	53,741	1,292,360
Smelter fluxes—fluorspar, limestone, quartz, sand, etc.....		1,230,228		25,013	1,255,241
Hospital equipment and medical supplies.....	557	18,155	3,565	7,276	29,553
Stationery, office equipment and supplies, survey and drafting equipment and supplies.....	33,979	60,457	19,242	113,646	227,324
Miscellaneous materials, n.o.p. (includes all materials not otherwise provided for in any other item).....	175,071	635,987	92,362	439,779	1,343,199
Power—electric.....	752,188	1,605,660	618,922	3,350,959	6,327,729
Freight (a) Incoming—only amounts paid direct to Railway Company.....	588,700	4,835,661	592,494	2,581,106	8,597,961
(b) Outgoing.....	54,225	1,089,835	694,406	2,056,483	3,894,949
Express (a) Incoming—only amounts paid direct to Express Company.....	8,961	14,472	2,604	13,864	39,901
(b) Outgoing.....	9,854	3,513		2,494	15,861
Insurance (a) Fire.....	59,454	67,415	33,357	63,643	223,869
(b) Sickness and accident.....	662	17,069		4,079	21,810
(c) Group.....	2,818	14,542		94,220	111,580
(d) Workmen's compensation.....	147,300	404,432	141,732	332,642	1,026,106
(e) Bullion.....	1,887	169		4,570	6,626
(f) Other.....	2,753	10,031	905	12,599	26,288
Total.....	6,969,025	30,227,098	5,489,584	16,646,002	59,331,709
Comparative totals for 1935.....	5,102,654	18,742,299	3,555,101	9,781,454	37,181,508

NOTE.—Corresponding data were not collected for 1936.

Table 38.—Purchases of Mining and Milling Equipment, General Supplies, and Freight and Insurance Expenditures, by the Canadian Gold Mining Industries, 1937

	Nova Scotia	Quebec	Ontario	Manitoba	Saskatche- wan and Northwest Territories	British Columbia and Yukon	Canada
	\$	\$	\$	\$	\$	\$	\$
Belting of all kinds, including ele- vator, conveyor, transmission, etc., and fasteners for same.....	506	34,767	94,812	2,949	9,535	12,271	154,849
Bolts, nuts, rivets, studs, washers, coach, set and machine screws, etc.....	1,621	27,597	79,316	5,453	9,791	10,240	134,018
Castings—unfinished iron and steel	581	10,230	27,393	1,263	10,300	77,742	127,599
Unfinished brass castings; brass and copper rods and sheets, bab- bitt and non-ferrous metals of all kinds.....	202	10,960	32,307	1,204	4,554	2,400	51,637
Cars and locomotives and mech- anical parts for same.....	381	54,930	328,154	20,297	8,636	23,715	436,113
Track materials—rails and fittings, switches, spikes, bolts, etc.....	4,354	84,496	291,504	10,206	10,570	31,333	432,463
Explosives—powder, fuse and de- tonators.....	39,459	837,470	2,871,208	212,183	129,300	615,508	4,705,128
Rock drills and parts.....	15,953	210,156	716,972	41,897	26,936	117,751	1,129,665
Drill and tool steels.....	5,032	156,230	530,947	30,244	15,034	198,320	935,897
Pipe and fittings, plumbing sup- plies and valves.....	13,547	192,695	833,359	46,501	88,618	115,455	1,290,175
Iron and steel bars, sheets, plates and all structural steel.....	1,979	101,933	795,841	21,928	56,970	38,915	1,017,566
Wire rope and fittings.....	3,382	40,689	200,740	7,994	6,046	25,993	284,844
Diamonds and bort for drilling.....		18,164	129,534	12,862	1,410	12,513	174,483
Safety equipment and apparel— safety hats, boots, gloves, gog- gles, respirators, etc.; miners lamps and accessories and lamp rentals.....	3,875	21,276	163,775	5,380	6,569	13,548	214,423
Fuel—coal, coke, charcoal and wood.....	2,228	135,488	475,555	59,892	35,820	50,705	759,688
Fuel oil, kerosene and gasoline....	29,956	170,669	353,873	90,912	87,828	224,113	957,351
Lubricants—oil, grease and waste..	8,958	57,388	171,210	21,567	18,166	45,514	322,893
Lumber and timber of all kinds..	10,224	368,955	2,074,722	43,877	154,471	195,841	2,848,090
Building materials—cement, brick, tile, roofing and building paper, insulating material, building hardware, glass, putty, paints, varnishes and brushes, wood screws, nails, screw hooks and eyes, sand, lime, and miscel- laneous.....	4,986	227,783	914,204	35,543	90,202	47,419	1,320,137
Electrical equipment and supplies: motors, batteries, wire and cable, etc.....	7,300	285,320	866,560	54,972	174,287	207,396	1,595,535
Crushing, grinding and screening machinery and parts—ball and tube mill liners, roll shells, etc.	4,879	180,738	769,347	31,093	69,000	170,176	1,225,233
Filter cloth, rotor covers and ore dressing blankets.....	51	12,188	85,707	2,881	100	9,164	110,091
Balls and rods for grinding.....	9,641	166,860	847,027	52,994	9,230	128,633	1,214,385
Machinery, mill, n.o.p., and parts.	1,930	342,949	864,715	78,374	164,500	75,724	1,528,192
Machinery, mine, n.o.p., and parts —steel shop equipment, hoists, mine pumps, etc.....	23,453	292,648	927,825	72,742	89,295	315,836	1,721,790
Machinery, smelter, n.o.p., and parts.....	163	23,227	4,489			797	33,676

Table 38.—Purchases of Mining and Milling Equipment, General Supplies, and Freight and Insurance Expenditures, by the Canadian Gold Mining Industry, 1937—Concluded

	Nova Scotia	Quebec	Ontario	Manitoba	Saskatche- wan and Northwest Territories	British Columbia and Yukon	Canada
	\$	\$	\$	\$	\$	\$	\$
Machinery, miscellaneous, and parts—machine shop, blacksmith, carpenter shop and general surface equipment.....	3,926	135,971	361,158	31,884	97,010	36,490	666,439
Motor cars, trucks and accessories	4,143	13,389	88,860	33,613	13,400	37,539	190,944
Tools,—brooms, picks, shovels, hammers, handles, saws, wrenches, machinists' tools, etc.....	2,456	35,382	151,961	9,808	12,754	25,489	237,850
Welding and cutting equipment and accessories—oxygen, acetylene welding, rods, tips, etc.....	861	16,503	83,187	7,606	9,507	17,568	135,232
Rubber goods, suits, boots, hose and accessories, pump valves, launder linings, etc. (not including belts).....	5,110	38,015	165,131	12,456	4,226	15,703	240,641
Flotation reagents.....		47,764	123,399	200		44,019	215,382
Cyanide and cyanide plant chemicals.....	3,460	127,957	1,070,026	99,415	2,285	155,523	1,458,666
Acids and chemicals, n.o.p.....	1,154	39,733	176,199	6,831	5,447	10,253	239,617
Refractories—brick, cement, fire-clay, etc.....	574	9,319	54,709	2,107	19,652	5,080	91,441
Smelter fluxes—fluorspar, limestone, quartz, sand, etc.....	692	3,069	19,052	107	800	3,644	27,364
Hospital equipment and medical supplies.....	196	13,669	22,564	1,684	10,566	10,171	58,850
Stationery, office equipment and supplies survey and drafting equipment and supplies.....	1,660	47,594	156,281	6,034	8,437	19,996	240,002
Miscellaneous materials, n.o.p. (includes all materials not otherwise provided for in any other item).....	14,015	449,718	1,200,500	98,225	155,674	624,290	2,542,422
Power—electric.....	28,390	744,435	3,378,052	167,258		199,082	4,517,217
Freight (a) Incoming—only amounts paid direct to Railway Company...	2,251	265,526	1,332,165	78,206	108,396	369,225	2,155,769
(b) Outgoing.....	222	2,596	17,300	2,970		94,375	117,463
Express (a) Incoming—only amounts paid direct to Express Company....	942	23,963	20,089	254		20,245	65,493
(b) Outgoing.....	94	10,368	53,397	429		8,114	72,402
Insurance (a) Fire.....	4,950	124,870	346,766	37,448	1,478	59,981	575,493
(b) Sickness and accident.....		12,520	119,377		1,742		133,639
(c) Group.....	605	7,858	121,270	3,139	503	20,960	154,335
(d) Workmen's compensation.....	7,889	187,900	1,081,128	63,385	328	199,471	1,540,101
(e) Bullion.....	35	2,892	121,692	1,689		5,442	131,750
(f) Other.....	81	12,153	19,896	21,855	3,788	33,131	90,964
Total.....	278,347	6,443,970	25,735,255	1,651,811	1,733,161	4,782,813	40,625,357

PURCHASES OF MINING AND MILLING EQUIPMENT, GENERAL SUPPLIES, AND FREIGHT

	Gold Mining	Base Metal Mining, Smelting and Refining	Coal Mining
	Value f.o.b. plant	Value f.o.b. plant	Value f.o.b. plant
	\$	\$	\$
1. Belting of all kinds, including elevator, conveyor, transmission, etc., and fasteners for same	154,840	272,248	53,349
2. Bolts, nuts, rivets, studs, washers, coach, set and machine screws, etc.	134,018	216,242	93,567
3. Castings—unfinished iron and steel	127,509	395,876	63,865
4. Unfinished brass castings; brass and copper rods and sheets, babbitt and non-ferrous metals of all kinds	51,627	500,596	58,990
5. Cars and locomotives and mechanical parts for same	436,113	393,710	130,658
6. Track materials—rails and fittings, switches, spikes, bolts, etc.	432,463	372,021	340,909
7. Explosives—powder, fuse and detonators	4,705,128	2,303,358	482,265
8. Rock drills and parts	1,129,665	590,259	30,646
9. Drill and tool steels	935,807	437,023	14,229
10. Pipe and fittings, plumbing supplies and valves	1,290,175	1,217,268	307,054
11. Iron and steel bars, sheets, plates and all structural steel	1,017,566	1,658,529	381,798
12. Wire rope and fittings	284,844	269,308	334,913
13. Diamonds and bort for drilling	174,483	48,299	462
14. Safety equipment and apparel—safety hats, boots, gloves, goggles, respirators, etc.; miners' lamps and accessories and lamp rentals	214,423	246,089	138,665
15. Fuel—coal, coke, charcoal and wood	759,688	8,078,219	212,857
16. Fuel oil, kerosene and gasoline	957,351	1,585,962	55,473
17. Lubricants—oil, grease and waste	322,803	282,282	186,969
18. Lumber and timber of all kinds	2,848,090	3,227,606	1,522,266
19. Building materials—cement, brick, tile, roofing and building paper, insulating material, building hardware, glass, putty, paints, varnishes and brushes, wood screws, nails, screw hooks and eyes, sand, lime, and miscellaneous			
20. Electrical equipment and supplies—motors, batteries, wire and cable, etc.	1,320,137	1,663,330	183,530
21. Crushing, grinding and screening machinery and parts—ball and tube mill liners, roll shells, etc.	1,595,835	2,157,674	403,100
22. Filter cloth, rotor covers and ore dressing blankets	1,225,233	894,292	103,097
23. Balls and rods for grinding	110,091	195,876	
24. Machinery, mill, n.o.p., and parts	1,214,385	666,061	
25. Machinery, mine, n.o.p., and parts—steel shop equipment, hoists, mine pumps, etc.	1,528,192	751,225	13,284
26. Machinery, smelter, n.o.p., and parts	1,721,799	911,587	620,747
27. Machinery, miscellaneous, and parts—machine shop, blacksmith, carpenter shop and general surface equipment	33,676	1,854,361	
28. Motor cars, trucks and accessories	666,439	554,113	214,051
29. Tools—brooms, picks, shovels, hammers, handles, saws, wrenches, machinists' tools, etc.	190,944	189,077	68,002
30. Welding and cutting equipment and accessories—oxygen, acetylene welding, rods, tips, etc.	237,850	248,327	63,273
31. Rubber goods, suits, boots, hose and accessories, pump valves, launder linings, etc. (not including belts)	135,232	234,751	41,512
32. Flotation reagents	240,641	304,565	32,247
33. Cyanide and cyanide plant chemicals	215,382	1,243,247	
34. Acids and chemicals, n.o.p.	1,458,666	387,993	
35. Refractories—brick, cement, fireclay, etc.	239,617	539,978	6,599
36. Smelter fluxes—fluorspar, limestones, quartz, sand, etc.	91,441	1,292,360	16,440
37. Hospital equipment and medical supplies	27,364	1,255,241	
38. Stationery, office equipment and supplies, survey and drafting equipment and supplies	58,850	29,553	7,790
39. Miscellaneous materials, n.o.p. Includes all materials not otherwise provided for in any other item	240,002	227,324	82,212
40. Power—electric	2,542,422	1,343,199	2,048,043†
41. Freight (a) Incoming—only amounts paid direct to Railway Company	4,517,217	6,327,729	1,423,012
(b) outgoing	2,155,769	8,597,961	351,159
42. Express (a) Incoming—only amounts paid direct to Express Company	117,463	3,894,949	1,272,008
(b) outgoing	65,493	39,001	15,193
43. Insurance (a) Fire	72,402	15,861	588
(b) Sickness and accident	575,493	223,869	123,427
(c) Group	133,639	21,810	2,958
(d) Workmen's compensation	154,385	111,580	16,553
(e) Bullion	1,540,101	1,026,106	1,181,999
(f) Other	131,750	6,626	
	90,904	26,288	25,571
Total	40,625,357	59,331,709	12,725,330

† Includes railway locomotives and rolling stock, \$443,429; underground mine cars, \$234,227; coal cutting machinery and parts, \$404,439; horses and horse keep, including purchases of horses, oats, hay, harness, etc., \$224,064; ground limestone for dusting, \$38,358.

AND INSURANCE EXPENDITURES BY THE CANADIAN MINING INDUSTRY IN 1937

Oil and Gas Wells	Asbestos Mining	Gypsum Mining	Other Non-metallic Mining	Cement Plants	Lime Plants	Clay Products Plants	Stone Quarrying, Sand and Gravel Pits	Canada
Value f.o.b. plant	Value f.o.b. plant	Value f.o.b. plant	Value f.o.b. plant	Value f.o.b. plant	Value f.o.b. plant	Value f.o.b. plant	Value f.o.b. plant	Value f.o.b. plant
\$	\$	\$	\$	\$	\$	\$	\$	\$
2,115	120,075	3,148	11,561	19,757	3,637	9,376	19,661	669,767
4,734	16,538	1,842	4,111	11,819	2,664	8,670	16,152	510,357
6,961	127,805	1,374	4,278	17,975	6,946	18,289	8,817	779,695
11,674		812	2,776	6,319	1,047	1,895	5,361	641,097
75	12,684	20,424	12,931	11,584	6,114	7,699	15,708	1,047,625
1,205	14,552	5,467	624	9,081	973	2,121	10,661	1,188,947
200,001	298,088	41,998	30,704	56,655	50,737	16,742	185,218	8,172,098
377	14,882	3,841	6,309	4,555	4,640	754	16,603	2,002,155
1,121,968	1,518	2,005	3,161	1,777	1,423	455	11,811	1,409,586
65,492	13,626	5,250	8,603	16,943	6,317	7,270	8,469	4,002,943
27,484	128,740	4,505	11,293	68,362	16,945	49,018	9,548	3,411,796
	13,392	3,069	3,255	7,128	3,826	2,209	22,240	971,668
					130			233,374
1,608	3,126	784	1,211	1,543	250	40	1,216	608,955
2,609	488,430	17,983	112,541	1,308,949	279,654	709,824	74,648	12,045,402
82,330	12,113	33,667	129,419	29,786	44,574	28,647	116,235	3,075,557
41,351	54,358	9,918	23,103	27,716	6,583	36,642	38,400	1,030,125
38,746	69,574	71,88	20,498	19,726	11,322	33,590	21,332	7,819,938
23,625	20,221	8,880	34,299	48,710	9,680	22,072	15,542	3,350,026
16,735	174,766	4,659	17,481	60,091	16,190	15,786	22,757	4,485,074
1,551	103,791	26,534	69,015	121,080	6,153	53,797	68,812	2,673,355
			1,391	78				307,436
			4,945	69,117	160			1,954,668
	15,444	860	40,795	106,781	6,027			2,462,608
	14,521	94,805	29,071	10,088	23,169	2,317	30,487	3,458,591
				19,176				1,907,213
793,235	624,268	1,994	21,179	10,243	5,348	13,653	32,160	2,936,683
128,019		33,703	16,145	2,352	20,831	16,714	58,194	723,981
94,251	14,522	693	4,466	8,094	2,627	3,807	10,327	688,237
35,324	5,589	3,529	5,489	11,704	2,711	3,944	9,411	489,196
29,952	1,054	1,526	2,190	2,202	2,949	453	3,971	621,750
								1,458,629
								1,846,659
35,495	45,963	112	14,799	13,505	1,116			897,184
24,614		35	5,665	46,588	8,545	61,954	161	1,547,803
959	492	79	483	183,811	52,868			1,519,347
				1,987	668	177	1,019	102,057
30,858	20,694	545	8,080	5,374	3,812	11,332	9,297	639,530
408,719	545,695	12,372	27,569	696,845	30,734	84,465	146,981	7,887,044
5,622	784,167	33,926	37,534	603,287	49,023	130,741	175,582	14,087,840
216,378	44,901	9,991	74,295	208,118	77,707	116,570	42,609	11,895,458
1,182	219,774	28,147	33,473	191,644	22,822	128,141	394,856	6,304,459
2,664	1,364	227	1,550	108	1,345	435	1,994	130,274
175	98	18	1,440	8	15	12,333	196	103,134
40,212	52,210	10,475	9,586	7,833	8,399	34,408	57,768	1,143,680
4,313		33	3,021	286	431	3,146	4,100	173,737
51,159	37,897	1,519		5,165	2,113	7,975	114	388,410
13,051	93,883	11,930	23,309	17,344	15,750	11,947	62,768	3,998,188
				25,709				164,085
60	5,081	1,712	32,786	113,395	379	7,022	6,777	369,975
3,566,883	4,215,896	451,579	906,497	4,210,398	819,354	1,676,430	1,737,963	130,267,396

CHAPTER TWO

THE GOLD MINING INDUSTRY IN CANADA

Including—(a) The Alluvial Gold Mining Industry; (b) The Auriferous Quartz Mining Industry; (c) The Copper-Gold-Silver Mining Industry; (d) Miscellaneous Data on Monetary Gold and World Gold Production, Prices, Exchange, etc.; (e) Notes on Gold Mining in Other Countries.

Definition of the Industry.—Gold mining in Canada is classified into three principal industries—(a) the recovery of gold from the gravels and sands of stream channels or beaches or what is defined as “The Alluvial Gold Mining Industry”; (b) the recovery of lode gold, which is named “The Auriferous Quartz Mining Industry” and in which industry the gold is usually the most important economic constituent of the ores mined and quartz the predominant gangue mineral; (c) gold is often found in various other mineral deposits, more particularly in those of copper, and for this reason the review of Canada’s “Copper-Gold-Silver Mining Industry” is included here to complete a more comprehensive survey of the Canadian Gold Mining Industry.

In 1937, for the third consecutive year, the mining industry of Canada established an all-time high record in the production of gold. The output of new or primary gold from all sources totalled 4,096,213 fine ounces in 1937 compared with 3,748,028 fine ounces in 1936, or an increase of 9.29 per cent. According to preliminary figures of world production, Canada ranked third as a gold producing country in 1937, being surpassed in output by only the Union of South Africa and Russia, the figures for the latter country being conjectural. The mine output of gold in 1937 by the United States, and not including that of the Philippines and Puerto Rico, was recorded by the United States Bureau of Mines, in a preliminary report, at 4,057,884 fine ounces.

Increases in output over 1936 were realized in all Canadian gold mining provinces or territories with the exception of the Yukon and Alberta. In order of importance the principal gold producing provinces in 1937 were Ontario, Quebec and British Columbia and of the total quantity of gold recovered in the Dominion, 80.20 per cent was contained in gold bullion produced at the mines, 11.70 per cent in blister copper, 5 per cent in ores, matte, etc., exported, 2.20 per cent in crude placer gold, and 0.90 per cent in base (lead) bullion.

The estimated average price per ounce of fine gold, expressed in Canadian currency, was \$34.99 in 1937 compared with a price of \$35.03 in 1936. Practically all of Canada’s newly-mined gold bullion is sold to the Dominion Government through the Royal Canadian Mint at Ottawa or the Assay Office at Vancouver. This gold is refined, converted into fine gold bars weighing approximately 400 ounces each, and is disposed of in world markets wherever the most advantageous net price can be obtained.

The Economic Intelligence Service of the League of Nations, Geneva, in its Monetary Review for 1937-38, states—“Currency depreciation in the gold-mining countries has undoubtedly been the main stimulus to the expansion of gold production which has taken place. In 1936 the average percentage depreciation (in relation to 1929) of the currencies of twenty-three* gold producing countries, outside of the U.S.S.R., weighted according to their gold output in 1936, was approximately 43 per cent. On the assumption—which is true in most cases—that currency depreciation has entailed a corresponding rise in the price of gold received by producers, this means that the price of gold in these countries was, on the average, 76 per cent higher in 1936 than in 1929. (At the same time, the average of the percentage changes in wholesale price indices, weighted in the same manner, in sixteen of these countries for which such indices are available, indicated that prices of commodities, other than gold, were about 15 per cent lower in 1936 than in 1929.) If the rise in the price of gold in the twenty-three countries between 1929 and 1936 is weighted according to the 1929 figures for gold production the percentage increase obtained is 73 per cent. The difference between the two percentages is to some extent a reflection of the natural tendency of gold production to expand most in countries where the greatest rise in the price of gold has taken place.”

* Account for 96% of total world output outside the U.S.S.R. in 1936.

The Gold Clauses Act, 1937

In Canada an Act respecting Gold Clause obligations was passed by the House of Commons on April 8, 1937. The Act reads as follows:

1. This Act may be cited as The Gold Clauses Act, 1937.
2. The expression "gold clause obligation" in this Act means any obligation heretofore or hereafter incurred (including any such obligation which has, at the date of the commencement of this Act, matured) which purports to give to the creditor a right to require payment in gold or in gold coin or in an amount of money measured thereby, and includes any such obligation of the Government of Canada or of any province.
3. In the case of any gold clause obligation payable in money of Canada, tender of currency of Canada, dollar for dollar of the nominal or face amount of the obligation, shall be a legal tender and the debtor shall, on making payment in accordance with such a tender, be entitled to a discharge of the obligation.
4. In the case of any gold clause obligation governed by the law of Canada payable in Canada or elsewhere, in money other than money of Canada, tender of the nominal or face amount of the obligation in currency which is legal tender for the payment of debts in the country in the money of which the obligation is payable shall be a legal tender and the debtor shall, on making payment in accordance with such a tender, be entitled to a discharge of the obligation.
5. Any payment in respect of a gold clause obligation made before the commencement of this Act, which, if made hereafter, would entitle the debtor to a discharge, shall be deemed to have discharged the obligation.
6. Every gold clause obligation is hereby declared to be contrary to public policy and no such provision shall hereafter be contained in, or made in respect of, any obligation.
7. The provisions of this Act shall have full force and effect notwithstanding anything contained in any other statute or law.

Order in Council P.C. 426, March 1, 1938

WHEREAS subsection one of section twenty-five of the Bank of Canada Act, Chapter forty-three of the Statutes of Canada, 1934, provides that the Bank shall sell gold to any person who makes demand therefor at the head office of the Bank and tenders the purchase price in legal tender, but only in the form of bars containing approximately four hundred ounces of fine gold;

AND WHEREAS by Order in Council P.C. 425, dated March 1, 1937, passed under the provisions of subsection two of said section twenty-five of the said Act, the operation of said subsection one of section twenty-five was suspended for a period of one year from and after March 10, 1937.

NOW, THEREFORE, His Excellency the Governor General in Council, on the recommendation of the Minister of Finance and under the provisions of said subsection two of section twenty-five of the Bank of Canada Act is pleased to order that the operation of said subsection one of section twenty-five be and it is hereby suspended for a further period of one year from and after the tenth day of March, 1938, unless sooner rescinded by Order in Council.

Royal Canadian Mint.—The Ottawa Mint, established as a branch of the Royal Mint under the (Imperial) Coinage Act, 1870, and opened up on January 2, 1908, was by 21-22 Geo. V, C. 48, constituted a branch of the Department of Finance and since December 1, 1931, has operated as the Royal Canadian Mint. The great development of the gold mining industry in Canada has resulted in gold refining becoming one of the principal activities of the Mint. Gold coins have never been a popular medium of exchange in Canada and have not been struck since 1919, most of the fine gold produced from the rough shipments from the mines being delivered to the Department of Finance in the form of bars, the rest being sold in convenient form to manufacturers.

The domestic gold currency of Canada, as at present authorized by the Currency Act, consists of \$20, \$10, \$5 and \$2½ gold pieces, 900 millesimal fineness (only \$10 and \$5 pieces have been issued). Gold was used only to an insignificant extent as a circulating medium in Canada, its monetary use being practically confined to reserves; \$5 and \$10 gold pieces weighing respectively 129 and 258 grains, 9/10ths pure gold by weight, have been coined, the Canadian gold

dollar thus containing 23·22 grains of pure gold. The \$5, \$10 and \$20 gold coins of the United States, which contain exactly the same weight of gold as Canadian gold coins of these denominations, are legal tender for their face value only, as are the British sovereigns, which are legal tender for \$4.86 $\frac{2}{3}$, their equivalent in Canadian gold dollars.

The regulations in part for the receipt of gold bullion at the Royal Canadian Mint, Ottawa, are as follows: Each parcel of bullion for which a separate assay is required shall be regarded as a separate deposit, and no ingot exceeding 1,500 ounces troy, gross weight, will be accepted. All deposits shall be dealt with in the order in which they are received. Deposits containing, by assay, less than 200 parts of gold in 1,000, or appearing, either before or after melting and assaying, to be unsuitable for treatment by the refining process in use, may be rejected. A deposit so rejected shall be returned to the depositor on payment by him of any costs incurred for melting and assaying.

The Mint charges, to be calculated on the gross weight of the deposit after melting, shall be as follows:—

(a) For melting and assaying—one dollar for the first four hundred ounces or part thereof and twenty-five cents for each additional one hundred ounces or part thereof.

(b) For refining—when the deposit contains not more than 5 per cent base metal, 3 cents the ounce.

Over 5 per cent but not over 10 per cent base metal, 3 $\frac{1}{2}$ cents the ounce.

Over 10 per cent but not over 15 per cent base metal, 4 $\frac{1}{4}$ cents the ounce.

Over 15 per cent but not over 20 per cent base metal, 5 cents the ounce.

On deposits which contain over 20 per cent base metal, or which require other treatment a charge not exceeding 10 cents the ounce, to be determined by the cost of treatment.

The minimum charge for refining shall be two dollars for each deposit and the charge for refining shall apply to all deposits containing, by assay, less than 995 parts fine gold in 1,000.

An additional handling charge at the rate of 35 cents the ounce fine, to cover costs of realization in a market outside Canada, shall be made on all newly mined Canadian gold deposited with the Mint, and this charge shall be increased to \$1.00 the ounce fine on all other gold accepted as a deposit.

The gross value of gold deposited for sale with the Royal Canadian Mint or the Dominion of Canada Assay Office, Vancouver, shall be the market price of gold in the country to which the Government is at the time of the receipt of the deposit exporting gold, converted into Canadian funds at the average of the buying rates of exchange of that country reported to the Department of Finance by the Bank of Canada at 11 a.m. daily during the week in which the gold is deposited with the Mint or Assay office.

In addition to newly-mined Canadian gold there may be accepted at the Mint gold (over 1 ounce troy—fine) in the following forms:—old jewellery and dental scrap, provided it has not been melted or otherwise treated in any way to prevent its origin being readily recognized; scrap from manufacturers and refiners the result of processes carried out by them in the ordinary course of their business; gold coin which when of full weight and fineness, is not legal tender in Canada. Satisfactory evidence as to the origin of the gold shall be furnished by the depositor if required.

Delivery of deposits shall be accepted at the Mint counter only, free of all charges, and when bullion is forwarded by mail or express the original packages will not ordinarily be opened until an invoice of the description and weight of their several contents has been received. When there is a serious discrepancy between the actual and invoice weights of any deposit, further action in regard to it will be deferred pending communication with depositor.

The gross value of a deposit shall be calculated at a rate of one dollar for each 23·22 grains fine gold contained therein (equivalent to \$20·6718 the ounce fine) and at a rate for all silver in excess of one per centum of the weight of the deposit after melting to be determined by the Minister of Finance—the rate to be paid for silver in any week shall be one cent below the average for that week of the daily London quotation for standard silver from Monday to Friday, inclusive, converted into the equivalent for fine silver in Canadian funds at the average of the daily rate of exchange between Montreal and London, calculated to the nearest one-eighth of a cent.

Income Tax Exemption to New Mines

With a view to stimulating exploration and development of mineral resources in Canada, certain exemptions from income tax are granted to new or re-opened mines coming into production. An amendment to the Income Tax Act, made in May, 1936, provides that any metal-liferous mine coming into production between May 1, 1936, and January 1, 1940, shall be exempt from income tax for its first three fiscal periods following the commencement of production. The Minister of National Revenue, having regard to the production of ore in reasonable commercial quantities, shall determine which mines, whether new or old, qualify for this exemption, and a certificate will be issued accordingly. General regulations covering depletion allowance to precious metal mines are unchanged from the previous year and remain on the basis of $33\frac{1}{3}$ per cent for mining companies, with the allowance in the case of dividends received by shareholders standing at 20 per cent.

Table 39.—Production of New Gold in Canada, by Provinces and Sources, 1936 and 1937

(Gold at \$20-671834 per fine ounce)

	1936		1937	
	Fine troy ounces	\$	Fine troy ounces	\$
NOVA SCOTIA—				
In gold bullion and ores exported.....	11,960	247,235	19,918	411,742
Estimated exchange equalization on gold produced.....		171,724		285,189
Total value—Canadian Funds.....		418,959		696,931
QUEBEC—				
In blister copper, in ores shipped and in gold bullion.....	666,905	13,786,150	711,480	14,707,596
Estimated exchange equalization on gold produced.....		9,575,532		10,187,089
Total Value—Canadian Funds.....		23,361,682		24,894,685
ONTARIO—				
†Porcupine Area—In gold bullion.....	1,023,351	21,154,542	1,120,525	23,163,306
†Kirkland Lake—In gold bullion.....	965,165	19,951,731	999,446	20,660,382
†Other gold mines—In gold bullion.....	316,610	6,544,909	391,674	8,096,620
Copper-Nickel and other ores.....	73,377	1,516,837	75,450	1,559,690
Total.....	2,378,503	49,168,019	2,587,095	53,479,998
Estimated exchange equalization on gold produced.....		34,150,941		37,042,456
Total Value—Canadian Funds.....		83,318,960		90,522,454
MANITOBA—				
In gold bullion, ores shipped and in blister copper.....	139,273	2,879,028	157,949	3,265,096
Estimated exchange equalization on gold produced.....		1,999,705		2,261,540
Total Value—Canadian Funds.....		4,878,733		5,526,636
SASKATCHEWAN—				
In ore shipped to Canadian smelters and crude gold to Royal Canadian Mint.....	48,981	1,012,527	65,886	1,361,984
Estimated exchange equalization on gold produced.....		703,278		943,367
Total Value—Canadian Funds.....		1,715,805		2,305,351
ALBERTA—				
In alluvial gold.....	109	2,253	46	951
Estimated exchange equalization on gold produced.....		1,565		659
Total Value—Canadian Funds.....		3,818		1,610
BRITISH COLUMBIA—				
In alluvial gold.....	34,711	717,540	43,322	895,545
In gold bullion.....	212,251	4,387,617	254,996	5,271,235
In base bullion and in matte and ores exported.....	204,976	4,237,230	207,539	4,290,212
Total.....	451,938	9,342,387	505,857	10,456,992
Estimated exchange equalization on gold produced.....		6,489,001		7,242,944
Total Value—Canadian Funds.....		15,831,388		17,699,936
YUKON—				
In alluvial gold.....	50,192	1,037,561	46,679	964,941
In ores shipped.....	(a) 167	3,452	1,303	26,935
Total.....	50,359	1,041,013	47,982	991,876
Estimated exchange equalization on gold produced.....		723,063		687,014
Total Value—Canadian Funds.....		1,764,076		1,678,890
Total for Canada.....	3,748,028	77,478,612	4,096,213	84,676,235
Total estimated exchange equalization on gold produced.....		53,814,809		58,650,258
Grand Total Value, including Exchange.....		131,293,421		143,326,493

In 1936 the estimated average price of a troy ounce of fine gold in Canadian funds was \$35.03; in 1937 the corresponding price was \$34.99.

† Includes relatively small amounts of gold contained in slags, and ore shipped.

(a) Includes 1 ounce recovered in the Northwest Territories.

Table 40.—Production of Gold in Canada, by Principal Mines, 1937

Property and Province	Ore raised	Ore treated	(x) Gold production	Mill capacity 24 hours	See footnotes
	Tons	Tons	Fine oz.	Tons	
NOVA SCOTIA					
Avon Gold Mines Ltd.....	1,697	1,697	504	40	(a)
Beaver Dam Gold Mines Ltd.....	74	74	13	10	(a)
Consolidated Mining & Smelting Co. of Canada Limited (Caribou-Holman).....	816	795	352	20	(a)
Douglas, L. H. (Whiteburn).....	245	180	85	3	(a)
Guysborough Mines Ltd.....	35,523	24,032	6,211	100	(a) (b)
Lacey Gold Mine (N.S. Govt.).....	2,483	2,461	66	25	(c) (a)
MacDonald-Hudson (Country Harbour).....	25			20	
Montague Gold Mines Ltd.....	30,982	21,484	4,475	60	(a) (d)
Nugold Mining Corporation Ltd.....	3,595	3,485	261	25	(a) (e)
Otter Lake Gold Mines Ltd.....	1,090	545	70	25	(a) (f)
Prasac Ltd.....	19	17		2	(a)
Queens Mines Ltd.....	631	631	157	35	(a)
Scotia Metals Ltd.....		475	231		(g)
Seal Harbour Gold Mines Ltd.....	68,944	68,944	6,109	200	(h)
In silver-lead-zinc and other gold ores.....			1,384		
Total—Nova Scotia.....			19,918		

FOOTNOTES—

- (a) Amalgamation.
 (b) 11,491 tons material sorted (discarded).
 (c) In addition, 7.2 tons concentrates stored assaying 1.34 oz. gold per ton.
 (d) 9,498 tons sorted (discarded).
 (e) 21 tons concentrates stored assaying 1.3 oz. gold per ton.
 (f) 545 tons sorted and 13.6 tons concentrates stored assaying .883 oz. gold per ton.
 (g) Production included gold in bullion made and in concentrates exported.
 (h) Cyanidation and amalgamation; 2,685 tons material sorted (discarded).

QUEBEC					
Arntfield Gold Mines Ltd.....	65,472	65,692	6,802		(c)
Beattie Gold Mines (Quebec) Ltd.....	581,020	580,520	66,226	1,500	(d)
Belleterre Mines Ltd.....	37,820	36,494	9,928	100	(e)
Canadian Malartic Gold Mines Ltd.....	232,436	232,326	29,794	700	(c)
Cournoir Mining Company Ltd.....	23,522	20,244	2,333	170	(c) (f)
Lamaque Mining Company Ltd.....	230,465	230,465	82,473	1,000	(c)
McWatters Gold Mines Ltd.....	35,425	33,636	12,074	150	(a) (c) (g)
O'Brien Gold Mines Ltd.....	45,151	44,832	39,800	80-150	(a) (c) (b)
Perron Gold Mines Ltd.....	145,235	122,398	30,059	340	(c) (h)
Powell Rouyn Gold Mines Ltd.....	30,244	(i)	4,345		(i)
Shawkey Gold Mining Co. Ltd.....	61,665	55,602	10,364	200	(a) (c) (j)
Sigma Mines (Quebec) Ltd.....	134,305	125,407	28,264	300	(c)
Siscoe Gold Mines Ltd.....	200,314	(k) 200,502	73,720	580	(a) (c)
Stadacona Rouyn Mines Ltd.....	78,307	(l) 101,786	13,866	300	(a)
Sullivan Consolidated Mines Ltd.....	107,455	55,074	21,751	150	(a) (c)
Thompson Cadillac Mining Corp.....	39,782	38,081	2,016	200	(a) (m)
Copper-gold-silver and other ores.....			277,665		
Total—Quebec.....			711,480		

FOOTNOTES—

- (a) Amalgamation.
 (b) 29,244 tons waste discarded; output includes 1,974 oz. gold recovered from old concentrates.
 (c) Cyanidation.
 (d) Cyanidation and concentrates shipped to smelter.
 (e) Cyanidation; 4,076 tons material sorted (discarded).
 (f) 3,278 tons discarded (sorted).
 (g) 1,789 tons material discarded (sorted) and 765 tons tailings re-treated.
 (h) 22,837 tons material discarded (sorted); output includes 1,022 fine oz. recovered in 1936 but not shipped until 1937.
 (i) Crude ore shipped to smelter.
 (j) 6,063 tons material discarded (sorted).
 (k) Includes 21,880 tons material discarded (sorted).
 (l) Includes 23,479 tons from old ore dump.
 (m) 1,061 tons concentrates stored assaying 1.89 oz. gold per ton.

Table 40.—Production of Gold in Canada, by Principal Mines, 1937—Continued

Property and Province	Ore raised	Ore treated	(x) Gold production	Mill capacity 24 hours	See footnotes
	Tons	Tons	Fine oz.	Tons	
ONTARIO					
Porcupine Area—					
Buffalo Ankerite Gold Mines Ltd.....	353,544	343,093	80,893	1,000	(c) (b)
Coniaurum Mines Ltd.....	166,980	166,980	41,700	500	(c)
Delnite Mines Ltd.....	29,294	38,750	6,521	200	(c)
Dome Mines Ltd.....	576,300	576,300	213,403	1,500	(a) (c)
Gillies Lake-Porcupine Gold Mines Ltd.....	25,121	16,911	3,776	60	(c) (d)
Hallnor Mines Ltd.....	14,475				
Hollinger Consolidated Gold Mines (Timmins).....	1,718,954	1,719,199	424,073	6,000	(c)
Hollinger Consolidated Gold Mines (Ross).....	31,352	31,336	9,904	80	(c)
Mace Gold Mines Ltd.....	94,385	94,240	11,602	300	(c)
McIntyre Porcupine Mines Ltd.....	869,060	870,160	233,029	2,400	(c)
Moneta Porcupine Mines Co.....	13,000				
Pamour Porcupine Mines Ltd.....	264,501	276,168	58,348	750	(c)
Paymaster Consolidated Mines Ltd.....	173,924	169,658	36,071	500	(c) (e)
Porcupine Lake Gold Mining Co. Ltd.....	150	(f) 52	37		(f)
Preston East Dome Mines Ltd.....	9,029				
Other mines.....			1,168		
Total—Porcupine Area.....			1,120,525		
Kirkland and Larder Lake Areas—					
Biggood Kirkland Gold Mines Ltd.....	44,362	44,732	12,251	125	(c)
Golden Gate Mining Co. Ltd.....	1,000	(f) 225	147		(f)
Kerr Addison Gold Mines Ltd.....	10,274				
Kirkland Lake Gold Mining Co. Ltd.....	84,886	84,886	35,666	225	(c)
Lake Shore Mines Ltd.....	900,321	900,321	443,160	2,300	(c)
Macassa Mines Ltd.....	91,350	90,617	41,762	275	(c)
Morris Kirkland Gold Mines Ltd.....	36,158	35,970	5,672	100	(c)
Omega Gold Mines Ltd.....	160,272	160,272	21,132	500	(c)
Raven River Mines Ltd.....	2,426	2,425	363	60	(c) (g)
Sylvanite Gold Mines Ltd.....	174,925	174,566	63,393	525	(c)
The Teck-Hughes Gold Mines Ltd.....	371,097	371,097	124,999	1,225	(c) (h)
Toburn Gold Mines Ltd.....	38,255	37,465	26,242	150	(c) (i)
Wright-Hargreaves Mines Ltd.....	436,500	436,500	224,092	1,200	(c)
Other mines.....			567		
Total Kirkland and Larder Lake Areas.....			999,446		
Other Gold Mining Areas in Ontario—					
Ackeman Gold Mines Ltd.....	2,182				
Albany River Mines Ltd.....	1,000				
Algold Mines Ltd.....	(j)	11,064	1,187	100	(a) (k)
Algoma Summit Gold Mines Ltd.....	62,813	44,869	1,945	500	(a) (l)
Argosy Gold Mines Ltd.....	32,766	31,021	10,106	125	(a) (c) (m)
Bankfield Consolidated Mines Ltd.....	26,587	26,437	11,136	130	(a) (c) (n)
Central Patricia Gold Mines Ltd.....	77,119	77,119	39,761	200	(c)
Consolidated Mining and Smelting Company of Canada, Ltd. (Cordova Mine).....	7,193				
Consolidated Mining and Smelting Company of Canada, Ltd. (New Golden Rose).....	18,084	16,811	3,864	100	(c) (o)
Darwin Gold Mines Ltd.....	14,604	14,720	6,131	50	(a) (c)
Elora Gold Mines Ltd.....	9,251	8,888	535	60	(a) (p)
Gold Eagle Gold Mines Ltd.....	7,876	6,599	2,074	125	(c) (q)
Hollinger Consolidated Gold Mines Ltd. (Young-Davidson).....	337,127	337,556	32,119	600	(c)
Howey Gold Mines Ltd.....	535,949	447,344	31,194	1,100	(c) (r)
J. M. Consolidated Gold Mines Ltd.....	31,898	31,225	9,490	100	(c) (s)
Lebel Oro Mines Ltd.....	23,758	23,687	4,297	75	(c)
Leitch Gold Mines Ltd.....	25,507	23,058	12,836	75	(a) (c) (t)
Little Long Lac Gold Mines Ltd.....	122,627	98,025	46,783	275	(a) (c) (u)
Matachewan Consolidated Mines Ltd.....	133,118	132,754	20,232	300	(c)
McKenzie Red Lake Gold Mines Ltd.....	69,818	58,001	24,525	150	(c) (v)
Northern Empire Mines Co. Ltd.....	65,026	65,026	20,153	175	(c)
Olive Gold Mines.....	330	330	50	24	(a)
Parkhill Gold Mines 1937 Ltd.....	25,209	25,209	5,715	75-80	(c)
Pickle Crow Gold Mines Ltd.....	110,899	98,063	64,790	400	(a) (c)
Red Lake Gold Shore Mines Ltd.....	64,826	47,557	12,868	125	(c) (x)
St. Anthony Gold Mines Ltd.....	19,213	17,896	4,443	125	(c) (y)
Sand River Gold Mining Co. Ltd.....	(j)	(j)	340	75	(c)
Sturgeon River Gold Mines Ltd.....	25,641	17,978	8,839	85	(a) (c)
Tashota Goldfields Ltd.....	15,732	14,454	3,437	70	(a)
Wendigo Gold Mines Ltd.....	25,464	21,175	7,225	50	(a) (z1)
Miscellaneous gold mines.....			5,599		
Total—Other Gold Mines.....			391,674		
Nickel-copper mines.....			75,450		
Total—Ontario (all mines).....			2,587,095		

Table 40.—Production of Gold in Canada, by Principal Mines, 1937—Continued

FOOTNOTES FOR ONTARIO—

- (a) Amalgamation.
 (b) 10,451 tons material discarded (sorted).
 (c) Cyanidation.
 (d) 8,211 tons material discarded (sorted).
 (e) 1,166 tons tailings re-treated.
 (f) Ore shipped to smelter.
 (g) 95 tons material discarded (sorted).
 (h) 41,333 tons of tailings re-treated.
 (i) 790 tons material discarded (sorted).
 (j) Data not recorded.
 (k) Milling commenced March 1st.
 (l) 5,438 tons material discarded (sorted); 391.6 tons residues stored, assaying 1.2 oz. gold per ton; (milling commenced April 1st).
 (m) 1,745 tons material discarded (sorted).
 (n) Milling commenced May 12th.
 (o) 1,025 tons material discarded (sorted).
 (p) Mill operated February to September; 24 tons material discarded.
 (q) 1,277 tons material discarded; milling commenced October, 1937.
 (r) 88,605 tons material discarded (sorted).
 (s) 673 tons material discarded.
 (t) 2,928 tons material discarded (sorted).
 (u) 24,602 tons material discarded (sorted); 6,906 tons tailings re-treated.
 (v) 11,817 tons material discarded (sorted).
 (w) 12,836 tons material discarded (sorted).
 (x) 17,269 tons material discarded (sorted).
 (y) 1,317 tons material discarded (sorted).
 (z) 7,663 tons material discarded (sorted); milling commenced April 1st.
 (z1) 4,289 tons material discarded (sorted).

Property and Province	Ore raised	Ore treated	(x) Gold production	Mill capacity 24 hours	See footnotes
	Tons	Tons	Fine oz.	Tons	
MANITOBA					
Central Manitoba Mines Ltd.....	19,785	18,255	5,992	150	(a) (c) (b)
God's Lake Gold Mines Ltd.....	61,477	61,377	17,871	200	(a) (c)
Gunnar Gold Mines Ltd.....	54,399	49,841	16,735	150	(c) (d)
Gurney Gold Mines Ltd.....	9,828	8,131	1,676	125	(c) (e)
Laguna Gold Mines Ltd.....	38,349	29,642	14,822	50	(a) (c) (f)
San Antonio Gold Mines Ltd.....	115,226	115,765	30,036	300	(a) (c)
Copper-gold-silver and other mines.....			70,817		
Total—Manitoba.....			157,949		

FOOTNOTES—

- (a) Amalgamation.
 (b) 25,388 tons tailings re-treated; 1,530 tons material discarded (sorted); operations ceased in November.
 (c) Cyanidation.
 (d) 4,558 tons material discarded (sorted).
 (e) 1,097 tons material discarded (sorted); milling commenced in October, 1937.
 (f) 8,707 tons material discarded (sorted).

SASKATCHEWAN					
Athona Mines (1937) Ltd.....				15	
Monarch Gold Miners Syndicate Ltd.....	2,047	1,569	917	15	(a) (b)
Copper-gold-silver and other mines.....			64,969		
Total—Saskatchewan.....			65,886		

FOOTNOTES—

- (a) Amalgamation.
 (b) 478 tons material discarded (sorted); milling February to September.

ALBERTA					
Placer gold.....			46		

Table 40.—Production of Gold in Canada, by Principal Mines, 1937—Concluded

Property and Province	Ore raised	Ore treated	(x) Gold production	Mill capacity 24 hours	See footnotes
	Tons	Tons	Fine oz.	Tons	
BRITISH COLUMBIA					
Ashloo Gold Mines Ltd.	6,056	6,056	2,188	25	(b)
Bayonne Consolidated Mines Ltd.	15,934	15,934	9,302	50	(a) (c)
Bralorne Mines Ltd.	170,686	170,686	(d) 83,081	475	(a)
Cariboo Gold Quartz Mining Co. Ltd.	(e)	69,324	29,293	250	(c)
Clubine Comstock Gold Mines Ltd.	998	998	909		(b)
Danzig Mines Ltd.	33	33	18		(b)
Dentonia Mines Ltd.		(f) 17,727	522	100	(b)
Fairview Amalgamated Gold Mines Ltd.	(e)	34,885	3,747	150	(b) (g)
Gold Mountain Mines Ltd.	6,500	6,500	946	50	(b)
Hedley Mascot Gold Mines Ltd.	61,025	59,115	21,422	175	(b) (h)
Home Gold Mining Co. Ltd.	950	350	41	20	(b) (i)
Island Mountain Mines Co. Ltd.	33,903	33,903	13,875	110	(c)
I.X.L. Leasors Ltd.	284	284	356		(b)
Kalamalka Gold Mines Ltd.	2,742	2,282	987		(b)
Kelowna Exploration Co. Ltd.	77,858	77,887	29,929	200	(c) (b)
Kootenay Belle Gold Mines Ltd.	41,600	39,935	16,098	100	(c) (j)
Kootenay Ore Hill Gold Mines Ltd.	1,491	1,491	984	15	(b)
Livingstone Mining Co. Inc.	(e)	2,620	868	30	(a) (b) (k)
McArthur-Athelstan Mine.	702	702	406		(b)
McArthur-Granby-Phoenix.	15,376	15,376	1,451	50	(b)
McArthur-Brooklyn mine.	1,878	1,878	625	(e)	(b)
Minto Gold Mines Ltd.	32,556	32,556	4,352	120	(a) (b) (c)
Noble Five Mines Ltd.	78	78	134		(b)
Osoyoos Mines Ltd.	26,423	(e)	1,897	50	(b)
Pioneer Gold Mines of B.C. Ltd.	147,876	130,864	61,335	300	(a) (c) (l)
Polaris-Taku Mining Co. Ltd.	(e)	8,831	(e)	150	(m)
Privateer Mines Ltd.	422	422	2,805		(b)
Relief Arlington Mines Ltd.	37,851	26,822	13,171	75	(c) (n)
Reno Gold Mines Ltd.	(o) 45,978	45,984	22,812	120	(a) (c)
Reward Mining Co. Ltd. (Surf Point).	17,043	7,140	2,769	25	(b) (p)
Riegel Mines Ltd.	355	355	250		(b)
Sheep Creek Gold Mines Ltd.	(e)	54,243	23,923	150	(c)
Silbak Premier Mines Ltd.	201,206	201,206	47,746	500	(b)
Surf Inlet Cons. Gold Mines Ltd.	14,383	12,432	3,650	75	(b) (q)
Velvet Gold Mining Co. and Velvet Gold Copper Mines Ltd	7,948	(r) 883	1,085	100	(b)
Venus-Juno Mine (lease).	165	165	224		(b)
Vidette Gold Mines Ltd.	11,074	11,016	5,356	60	(b)
Wellدون Mining, Milling & Power Co. Ltd.	2,311	2,226	710	20	(b) (s)
Wesko Mines Ltd.	34,633	34,633	7,454	100	(c) (b)
Wilcox Mining Syndicate.	2,440	2,440	614	20	(a) (b)
Windpass Gold Mining Co. Ltd.	13,180	13,180	4,737	50	(b) (t)
Ymir Yankee Girl Gold Mines Ltd.	39,356	39,356	10,889	100	(b)
Ymir Consolidated Gold Mines Ltd.	(e)	8,702	2,826	100	(b) (v)
Placer gold.			43,322		
Copper-gold, silver-lead, and other gold mines.			26,748		
Total—British Columbia.			505,857		

FOOTNOTES FOR BRITISH COLUMBIA—

- (a) Amalgamation.
 (b) In concentrates or ore shipped to smelter.
 (c) Cyanation.
 (d) Includes gold in concentrates shipped to smelter; in addition 98 tons concentrates stored assaying 4.68 oz. gold per ton.
 (e) Not recorded.
 (f) Tailings.
 (g) 515 tons material discarded (sorted).
 (h) 53 tons concentrates stored assaying 3.30 oz. gold per ton.
 (i) 93 tons material discarded (sorted).
 (j) 1,665 tons material discarded (sorted).
 (k) 6 tons concentrates stored assaying 1.85 oz. gold, also 10,404 tons material discarded (sorted).
 (l) 17,054 tons material discarded (sorted).
 (m) Testing new mill; 511 tons concentrates produced assaying 3.88 oz. gold per ton.
 (n) 11,029 tons material discarded (sorted).
 (o) Ore drawn.
 (p) 29 tons concentrates stored assaying 7.32 oz. gold per ton; 9,903 tons material discarded (sorted).
 (q) 1,951 tons material discarded (sorted).
 (r) Concentrates.
 (s) 1,074 tons tailings also retreated.
 (t) 2,631 tons tailings also retreated.
 (v) 600 tons material discarded (sorted).

YUKON				
Placers.			46,679	
Silver-lead ores.			1,303	
Total—Yukon.			47,982	
Grand Total—Canada.			4,096,213	

NOTES.—In addition to gold produced, many mines listed, especially in British Columbia, produce important quantities of silver, lead, zinc and copper.

(x) It should also be noted that gold production figures usually represent shipments and do not necessarily indicate in all cases, the exact recoveries from the actual tonnages recorded as treated in the foregoing table, i.e., bullion reported as recovered or shipped may contain relatively small quantities of precious metals recovered from ores or concentrates treated during the latter part of the preceding year.

Table 41.—Production of Gold in Canada, 1928-1937

Year	Fine ounces	Value*	Year	Fine ounces	Value*	Value in Canadian funds
		\$			\$	\$
1928.....	1,890,592	39,082,005	1931.....	2,693,892	55,687,688	58,093,396
1929.....	1,923,308	39,861,663	1932.....	3,044,387	62,933,063	71,479,373
1930.....	2,102,068	43,453,601	1933.....	2,949,309	60,967,626	84,350,237
			1934.....	2,972,074	61,438,220	102,536,553
			1935.....	3,284,890	67,904,700	115,595,279
			1936.....	3,748,028	77,478,612	131,293,421
			1937.....	4,096,213	84,676,235	143,326,493

NOTE.—For years 1858 to 1927, see previous reports.

*Calculated from the value \$1=0.048375 ounces.

Table 42.—Quantity and Value of Gold Produced in Canada, by Provinces, 1928-1937

(For the years 1862 to 1927, see Mineral Production of Canada, 1928)

Year	Nova Scotia			Quebec		
	Fine oz.	Valued at \$20.671834 per fine oz.	Value in Canadian dollars	Fine oz.	Valued at \$20.671834 per fine oz.	Value in Canadian dollars
		\$	\$		\$	\$
1928.....	1,290	26,667	53,534	60,006	1,240,434	2,499,512
1929.....	2,687	55,545	53,534	90,798	1,876,961	2,876,350
1930.....	1,272	26,295	53,534	141,747	2,930,170	4,505,539
1931.....	460	9,509	39,525	300,075	6,203,101	9,417,075
1932.....	964	19,925	121,613	401,105	8,291,576	12,455,347
1933.....	1,382	28,565	121,613	382,886	7,914,956	10,950,539
1934.....	3,525	72,868	121,613	390,097	8,064,020	13,458,725
1935.....	9,376	193,819	329,942	470,552	9,727,173	16,568,725
1936.....	11,960	247,235	418,959	666,905	13,786,150	23,361,682
1937.....	19,918	411,742	696,931	711,480	14,707,596	24,894,685

Year	Ontario			Manitoba		
	Fine oz.	\$	\$	Fine oz.	\$	\$
1928.....	1,578,434	32,629,126	53,534	19,813	409,571	786,350
1929.....	1,622,267	33,535,234	53,534	22,455	464,186	9,267
1930.....	1,736,012	35,886,552	53,534	23,189	479,359	3,583,866
1931.....	2,085,814	43,117,600	44,980,280	102,969	2,128,558	2,220,512
1932.....	2,280,105	47,133,952	72,634,195	122,507	2,532,444	2,876,350
1933.....	2,155,519	44,558,351	61,647,843	125,310	2,590,388	3,583,866
1934.....	2,105,339	43,521,218	72,634,195	132,321	2,735,818	4,565,075
1935.....	2,220,336	45,898,417	78,133,624	142,613	2,948,072	5,018,551
1936.....	2,378,503	49,168,019	83,318,960	139,273	2,879,028	4,878,733
1937.....	2,587,095	53,479,998	90,522,454	157,949	3,265,096	5,526,636

Year	Saskatchewan			Alberta		
	Fine oz.	\$	\$	Fine oz.	\$	\$
1928.....				68	1,406	
1929.....				5	103	
1930.....						
1931.....				195	4,031	4,205
1932.....	11	227	258	83	1,716	1,949
1933.....	5,400	111,628	154,440	324	6,698	9,267
1934.....	5,405	111,731	186,472	393	8,124	13,558
1935.....	14,323	296,083	504,026	150	3,101	5,279
1936.....	48,981	1,012,527	1,715,805	109	2,253	3,818
1937.....	65,886	1,361,984	2,305,351	46	951	1,610

Year	British Columbia			Yukon*		
	Fine oz.	\$	\$	Fine oz.	\$	\$
1928.....	196,617	4,064,434	34,364	34,364	710,367	
1929.....	154,204	3,187,680	35,892	35,892	741,954	
1930.....	164,331	3,397,023	35,517	35,517	734,202	
1931.....	160,069	3,308,920	3,451,865	44,310	915,969	955,539
1932.....	199,004	4,113,778	4,672,429	40,608	839,442	953,438
1933.....	238,995	4,940,465	6,835,257	39,493	816,392	1,129,500
1934.....	296,196	6,122,915	10,218,762	38,798	802,026	1,338,531
1935.....	391,633	8,095,772	13,781,565	35,907	742,263	1,263,567
1936.....	451,938	9,342,387	15,831,388	50,359	1,041,013	1,764,076
1937.....	505,857	10,456,992	17,699,936	47,982	991,876	1,678,890

*Includes 1 ounce contained in ore shipped from the Northwest Territories in 1936.

Table 43.—World Production of Gold Ore, 1935-1937

(In terms of metal) (Fine troy ounces) Supplied by Imperial Institute

Producing Country	1935	1936	1937	Producing Country	1935	1936	1937
	Fine troy ounces	Fine troy ounces	Fine troy ounces		Fine troy ounces	Fine troy ounces	Fine troy ounces
BRITISH EMPIRE—				FOREIGN COUNTRIES—Con.			
United Kingdom.....	148	1	60	Spain (estimated).....	3,800	4,000	(a)
Anglo-Egyptian Sudan....	8,551	7,659	7,388	Sweden.....	180,554	158,339	193,222
Bechuanaland Protectorate.....	11,418	16,748	17,577	U.S.S.R. (b).....	4,500,000	5,500,000	5,000,000
Gold Coast.....	358,835	428,144	559,212	Yugoslavia.....	78,607	84,876	87,560
Kenya.....	23,009	38,463	54,774	Abyssinia.....	13,700	25,700	(a)
Nigeria.....	38,962	33,364	26,466	Belgian Congo.....	370,400	389,272	419,654
Northern Rhodesia.....	1,647	4,452	4,228	Cameroon (French).....	2,829	11,027	14,224
Southern Rhodesia.....	726,281	797,061	804,219	Egypt.....	58	278	1,226
Sierra Leone.....	30,753	37,966	35,717	Eritrea.....	5,000	1,500	(a)
South West Africa.....	3,206	4,065	2,804	French Equatorial Africa.....	29,657	24,190	21,489
Swaziland.....	314	276	2,410	French West Africa (exports).....	125,671	114,416	128,343
Tanganyika Territory....	52,182	69,675	75,281	Liberia (exports).....	965	1,567	2,457
Uganda.....	5,651	13,231	16,947	Madagascar.....	15,464	15,200	15,000
Union of South Africa.....	10,773,991	11,336,214	11,734,575	Morocco (French).....	780	1,500	4,630
Canada.....	3,284,890	3,748,028	4,096,213	Mozambique.....	7,579	16,711	(a)
Newfoundland.....	12,728	16,114	22,470	Costa Rica.....	21,662	32,500	(a)
British Guiana.....	30,488	32,234	35,993	Dominican Republic.....	7,553	8,901	6,397
Burma.....	1,483	1,439	1,004	Guatemala.....	4,214	1,824	4,190
Cyprus (c).....	6,872	20,991	23,650	Honduras.....	12,274	17,982	21,553
Federated Malay States..	29,771	37,779	33,828	Nicaragua.....	24,789	23,123	24,242
Unfederated Malay States	276	761	519	Panama.....	5,198	9,189	.....
India.....	326,170	331,946	330,744	Porto Rico.....	63	483	17
Sarawak.....	28,549	23,372	19,214	Salvador.....	8,129	8,928	8,564
Australia.....	914,736	1,175,066	1,381,135	Mexico.....	682,319	753,950	846,381
Fiji.....	6,728	16,955	24,917	United States.....	3,236,951	3,782,669	4,122,884
New Guinea.....	184,009	220,974	217,152	Argentina.....	11,400	12,200	(a)
New Zealand.....	165,277	164,575	168,487	Bolivia (exports).....	.....	10	4,127
Papua.....	17,012	20,719	22,153	Brazil.....	119,084	125,674	145,800
Total.....	17,040,000	18,600,000	19,720,000	Chile.....	265,938	248,794	315,553
FOREIGN COUNTRIES—				Colombia.....	328,991	389,495	442,222
Bulgaria.....	17	(a)	(a)	Dutch Guiana (<i>crude</i>).....	11,340	14,268	12,756
Czechoslovakia.....	14,334	11,013	9,552	Ecuador.....	102,296	70,124	(a)
Finland.....	4,630	4,919	4,019	French Guiana (exports).....	47,421	45,526	45,557
France.....	91,595	85,680	66,420	Peru.....	110,959	152,405	168,665
Germany.....	5,957	7,584	8,028	Venezuela.....	112,390	109,994	116,517
Hungary.....	2,070	1,093	(a)	Formosa (estimated).....	85,000	107,000	112,000
Italy.....	4,000	8,900	7,800	French Indo-China.....	8,552	9,025	10,127
Norway.....	231	42	96	Japan.....	589,030	713,666	(a)
Portugal.....	.....	3,282	3,982	Korea.....	540,000	650,000	(a)
Roumania.....	150,169	160,023	166,795	Netherlands East Indies..	68,249	71,689	55,616
				Philippine Islands.....	451,818	599,657	716,967
				Total.....	12,600,000	14,700,000	14,900,000
				World's Total.....	29,600,000	33,300,000	34,600,000

Gold is also produced in China and "Manchoukuo"—an allowance for this production is made in the total.

(a) Information not available.

(b) Approximate figures only. It is not possible to form any reliable estimate from the data given in Russian publications.

(c) Exports.

Table 44.—Comparative Figures of Gold Production for the World Since the Discovery of America, also Production for Russia, Transvaal, United States, and Canada

	Russia (a)	Transvaal since the com- mencement of Fields (i)	United States (f) (a)	Canada since the recording of production in 1853	(a) World since the discovery of America
	Fine ounces	Fine ounces	Fine ounces	Fine ounces	Fine ounces
1493-1600.....					24,266,820
1601-1700.....					29,330,445
1701-1800.....					61,088,215
1801-1840.....					20,488,552
1841-1850.....			(c) 1,187,170		17,605,018
1851-1860.....				220,039	64,482,933
1861-1870.....			(d) 58,279,778	1,477,999	61,098,343
1871-1880.....			(e) 15,281,264	904,093	55,670,618
1881-1890.....		1,070,651	15,808,339	584,102	51,280,184
1891-1895.....		6,870,158	9,106,834	291,564	39,412,823
1896-1900.....		12,578,869	15,728,572	3,469,791	62,234,698
1901-1905.....		13,632,908	19,393,722	4,592,261	78,033,650
1906.....		5,792,823		556,415	19,471,080
1907.....		6,450,740		405,517	19,977,260
1908.....		7,056,266	22,993,218	476,112	21,422,244
1909.....		7,295,108		453,865	21,965,111
1910.....		7,527,108		493,707	22,022,180
1911.....		8,249,461	4,687,053	473,159	22,397,136
1912.....		9,107,512	4,520,719	611,885	22,605,068
1913.....	(g) 1,583,677	8,798,336	4,299,784	802,973	22,556,347
1914.....	1,733,914	8,394,322	4,572,976	773,178	21,652,883
1915.....	1,382,450	9,093,902	4,887,604	918,056	22,846,608
1916.....	1,089,885	9,296,618	4,479,057	930,492	22,032,542
1917.....	871,265	9,018,084	4,051,440	738,831	20,346,043
1918.....	554,588	8,418,292	3,320,784	699,681	18,588,127
1919.....	173,610	8,331,294	2,918,628	766,764	17,339,679
1920.....	73,945	8,158,226	2,476,166	765,007	16,146,830
1921.....	65,907	8,128,681	2,422,006	926,329	15,997,692
1922.....	191,614	7,009,767	2,363,075	1,263,364	15,496,859
1923.....	305,425	9,148,771	2,502,632	1,233,341	17,845,349
1924.....	546,550	9,574,918	2,528,900	1,525,382	18,619,481
1925.....	632,390	9,597,573	2,411,987	1,735,735	18,673,178
1926.....	760,605	9,954,762	2,335,042	1,754,228	19,117,568
1927.....	688,492	10,122,459	2,197,125	1,852,785	19,058,738
1928.....	385,800	10,354,157	2,233,251	1,890,592	18,885,849
1929.....	707,300	10,412,326	2,208,386	1,928,308	19,207,452
1930.....	1,501,083	10,716,349	2,285,603	2,102,068	20,903,736
1931.....	1,655,725	10,877,708	2,395,878	2,693,892	22,284,290
1932.....	1,938,000	11,557,858	2,449,032	3,044,387	24,098,676
1933.....	2,700,000	10,017,495	2,556,246	2,949,309	25,400,295
1934.....	3,858,000	10,479,194	3,091,183	2,972,074	27,372,374
1935.....	4,784,030	10,773,041	3,609,283	3,284,890	29,999,245
1936.....	(b) 5,173,000	11,335,094	4,357,394	3,748,028	32,930,554
1937.....	(b) 4,969,000	11,734,553	4,804,540	4,096,213	34,740,055
Total.....		327,930,227	244,744,671	60,406,416	1,256,992,826

(a) Supplied by United States Mint.

(b) Conjectural.

(c) 1792-1847.

(d) 1848-1872.

(e) 1873-1880.

(f) Including Philippine Islands production received in United States.

(g) Data not available for preceding years. A revision by the United States Mint of estimated Russian gold production for the years 1913 to 1934 was made from United States consular reports, based principally on Soviet publications. While available data are quite indefinite and, in many instances, contradictory, it is believed that this revision more nearly represents actual production than data heretofore used.

(h) Subject to revision.

(i) Annual Report—Department of Mines, Union of South Africa.

Table 45.—Source of Canadian Fine Gold Production, by Percentages, 1932-1937

	1932	1933	1934	1935	1936	1937
	%	%	%	%	%	%
In alluvial gold.....	1.8	2.0	2.0	1.84	2.27	2.20
In crude gold bullion*.....	79.3	79.8	78.68	78.83	77.37	80.20
In base bullion (from silver-lead ores, etc.).....	1.0	0.7	1.09	2.17	1.60	0.90
In blister copper.....	15.1	14.2	13.41	13.21	13.80	11.70
In ores, matte, slags, etc., exported.....	2.8	3.3	4.82	3.95	4.96	5.00
	100.0	100.00	100.00	100.00	100.00	100.00

*Includes a relatively small quantity of gold contained in interprovincial shipments of gold ores to smelters.

Gold Exports—Order in Council P.C. 3124, December 18, 1937

WHEREAS by Order in Council of May 17, 1932, P.C. 1150, regulations respecting the export of gold whether in the form of coin or bullion from the Dominion of Canada were made under the authority of the Gold Export Act;

AND WHEREAS the said regulations were, by Order in Council of December 22, 1936, P.C. 3235, continued in force until December 31, 1937;

AND WHEREAS, in the opinion of the Minister of Finance, it is expedient that the said regulations be continued in force beyond December 31, 1937;

NOW, THEREFORE, His Excellency the Governor General in Council, on the recommendation of the Minister of Finance and under the provisions of the said The Gold Export Act, is pleased to order that the provisions of the said regulations be and they are hereby continued in force and effect until December 31, 1938, unless sooner rescinded by Order in Council.

Table 46.—Imports into Canada and Exports of Gold, 1936 and 1937

(External Trade Branch—Dominion Bureau of Statistics)

Items	1936	1937
IMPORTS—		
Coins and bullion—		
Coins, British and Canadian and foreign gold coins..... \$	215,674	
Gold coin (From April 1, 1936)..... \$	597,992	38,860
Coin, n.o.p. (From April 1, 1936)..... \$	863,855	1,217,772
Gold in bars, blocks, ingots, drops, sheets or plates, unmanufactured, n.o.p.... \$	28,522	17,643
Total \$	1,706,043	1,274,275
Gold, other—		
Bullion fringe or gold fringe..... \$	8,633	3,435
Gold, silver, and Dutch or schlag metal leaf..... \$	61,724	68,027
Sweepings—Gold and silver..... \$	321	34
Manufactured, n.o.p..... \$	26,565	39,297
Electroplated ware and gilt ware, n.o.p..... \$	1,077,866	1,379,171
Gold, unmanufactured, for commercial purposes..... \$	135,764	137,669
Total \$	1,310,873	1,627,633
EXPORTS—		
Coin and bullion—		
Gold coin—		
Canadian..... \$		
Foreign..... \$	4,746,207	12,030,499
Gold bullion Canadian—monetary..... \$		
Gold bullion foreign—monetary..... \$		
Gold bullion—non-monetary—		
Canadian—To United Kingdom..... oz.	(126,845)	(71,592)
To United States..... oz.	4,476,000	2,511,436
Foreign..... oz.	(1,912,392)	(2,958,450)
..... \$	67,012,985	103,212,704
..... oz.		(372)
..... \$		12,999
Total—Canadian coin and bullion \$	71,488,985	105,724,140
Foreign coin and bullion \$	4,746,207	12,043,498
Grand Total—Coin and Fine Gold Bullion \$	76,235,192	117,767,638
Gold-bearing quartz, dust, nuggets and crude bullion obtained direct from mining operations (gold content)..... oz.	(a) (172,176)	(211,359)
Jewellers' sweepings, and precious metal scrap, n.o.p..... \$	5,891,517	7,101,093
..... \$	825,251	1,338,358
Total Ore, Sweepings, etc. \$	6,716,768	8,439,451

(a) In addition to the export of this Canadian material, there was an export of Foreign gold-bearing quartz, etc., in 1936, containing 423 ounces gold valued at \$12,200.

NOTE.—In 1936 the imports of liquid gold paint were valued at \$2,659 and in 1937 at \$1,775.

Monetary and Non-Monetary Gold Exports and Earmarked Gold

Exports of gold are distinguished in Canadian trade statistics as between monetary and non-monetary. Monetary gold exports are those which entail a reduction in the Dominion's monetary gold stocks. All other gold exports are classed as non-monetary and shown as merchandise in the trade statistics.

Table 49.—Estimated Balance of International Payments for Canada (Preliminary Statement for 1937)

(Internal Trade Branch)

(In millions of dollars)

	Credits — Exports Visible and Invisible	Debits — Imports Visible and Invisible	Net Credits (+) or Debits (—)
CURRENT ACCOUNT OF GOODS, SERVICES AND GOLD			
1. Commodity trade (adjusted).....	1,010	798	+212
2. Gold exports (1) and imports.....	145	.....	+145
3. Freight receipts and payments, n.o.p.....	90	116	— 26
4. Tourist expenditures (2).....	290	120	+170
5. Interest and dividend receipts and payments.....	78	325	—247
6. Immigrants' remittances.....	8	20	— 12
7. Government expenditures and receipts.....	7	12	— 5
8. Charitable and missionary contributions.....	1	2	— 1
9. Advertising transactions.....	2	2	.....
10. Motion picture remittances.....	.....	4	— 4
11. Capital of immigrants and emigrants.....	2	4	— 2
12. Earnings of Canadian residents employed in U.S.A. and U.S. residents employed in Canada.....	4	2	+ 2
13. Net payments for entertainment services, royalties, etc., not included above.....	.....	15	— 15
14. Total credits and debits as above.....	1,637	1,420	+217
15. Difference between debits and credits above.....	.....	217	.....
CAPITAL ACCOUNT			
1. New issues of Canadian securities sold abroad (including refinancing)....	92	.....	+ 92
2. Retirements of Canadian securities held abroad.....	.....	170	—170
3. Sales and purchases of outstanding securities.....	508	512	— 4
4. Insurance transactions, n.o.p. (Net).....	.....	28	— 28
5. Other known capital movements (3) (Net).....	.....	98	— 98
6. Total credits and debits as above.....	600	808	—208
7. Direct estimate of net outflow of capital.....	208	.....	.....
Residual item (4), Item 15 of current account minus Item 7 of capital account..	808	808	.....
	9	.....	.....

(1) Includes earmarked gold.

(2) Provisional estimate based on incomplete data.

(3) Net movement of funds resulting from the operations of British and foreign branch plants in Canada and the branches of Canadian firms abroad, including the transactions of trust companies and known short term movements of funds, n.o.p.

(4) This item represents either errors in the computations or the omission of transactions which could not be traced at the time the tables were prepared.

NOTE.

Commodity Trade.—Commodity trade figures exclude exports of non-monetary gold bullion and gold-bearing quartz, which are included with other gold in the gold item. Other adjustments have also been made for the balance of payments statement such as the exclusion of certain non-commercial items as well as merchandise imported by returning Canadian tourists, etc. The resulting credit balance is \$212 million.

Gold Exports and Imports.—Earmarked gold is included in this item as well as gold bearing quartz, non-monetary gold bullion and other gold coin and bullion. The net credits resulting from gold transactions were \$145 million.

Tourist Expenditures.—The credit balance shown by this preliminary estimate based on incomplete data is \$170 million.

Interest and Dividend Receipts and Payments.—The debit balance produced by these transactions was \$247 million.

Miscellaneous Transactions.—Miscellaneous transactions produced a net debit balance of \$63 million. This amount represents the excess of the debit balances arising from freight receipts and payments, immigrants' remittances, the expenditures of governments, charitable and missionary contributions, advertising transactions, motion picture remittances, capital of immigrants and emigrants and miscellaneous payments for other services, over the small credit balance from the earnings of international commuters.

Table 50.—Estimated Average Monthly Value of an Ounce of Fine Gold Expressed in Canadian Funds

Month	1931	1932	1933	1934	1935	1936	1937
	\$	\$	\$	\$	\$	\$	\$
January.....	20.71	24.24	23.64	33.05	34.95	35.06	25.01
February.....	20.67	23.67	24.74	35.29	35.05	35.18	35.01
March.....	20.67	23.11	24.78	35.08	35.40	35.11	34.98
April.....	20.68	22.98	25.33	34.93	35.18	35.15	34.95
May.....	20.68	23.38	27.75	34.94	34.95	35.00	34.94
June.....	20.73	23.83	28.24	34.73	35.05	35.09	35.02
July.....	20.74	23.73	30.58	34.59	35.08	34.91	35.05
August.....	20.73	23.61	30.09	34.19	35.09	35.00	35.00
September.....	21.55	22.88	31.79	34.18	35.28	34.99	35.00
October.....	23.22	22.65	31.48	34.27	35.49	34.99	34.99
November.....	23.22	23.73	32.68	34.16	35.37	34.95	34.98
December.....	25.01	23.85	32.14	34.57	35.33	34.98	34.93
Yearly average.....	21.55	23.47	28.60	34.50	35.19	35.03	34.99

NOTE.—Procedure regarding the marketing of gold by the Department of Finance, Ottawa, is shown elsewhere in this report; also actual payment by the United States Treasury for gold in imported ores or concentrates is at 99.75 per cent of the price quoted by the United States Treasury, which in June, 1937, was equal to \$34.9125 (U.S.) per ounce.

DOMINION BUREAU OF STATISTICS

Table 51.—Canadian Gold Stocks, 1925-1937

(Thousands of fine ounces)

December 31	Dominion Notes— Statutory Reserve	Chartered Bank— Gold in Canada ⁽¹⁾	Postal Savings— Bank Reserve	Free Gold— Balance of— Minister of Finance	Total Gold Stock
1925.....	6,506	3,014	154	9	9,683
1926.....	6,187	3,115	150	9	9,461
1927.....	6,039	3,067	147	138	9,391
1928.....	4,152	2,961	141	221	7,475
1929.....	2,841	2,675	124	82	5,722
1930.....	4,398	2,612	117	140	7,267
1931.....	2,994	2,467	113	133	5,707
1932.....	3,395	2,056	109	29	5,589
1933.....	3,326	1,814	111	44	5,295
1934.....	3,183	1,822	107	285	5,397
	Bank of Canada Gold Reserve				
1935.....	5,158	1	105	136	5,400
1936.....	5,159	2	104	119	5,384
1937.....	5,160	2	106	55	5,323

⁽¹⁾ Including gold coin deposited in the Central Gold Reserves.

Note.—The amounts of gold held by chartered banks in Canada in 1925-1934 exclude an estimated figure of subsidiary coin holdings in 1925-1928 and an actual figure reported by the banks for 1929-1934 (Supplied by the Bank of Canada.)

Table 52. Fine Gold and Fine Silver Shipped to the Royal Canadian Mint, Ottawa, Canada, by Sources, 1936 and 1937

Province	1936		1937	
	Gold	Silver	Gold	Silver
	Fine ounces	Fine ounces	Fine ounces	Fine ounces
Vancouver Assay Office.....	93,437-787	18,692-34	89,827-890	17,803-37
Yukon sundries.....	6-585	1-76	21-449	2-12
British Columbia.....	281,492-846	48,792-86	298,591-999	56,602-40
Alberta sundries.....	108-577	8-85	45-736	4-19
Saskatchewan sundries.....			754-661	180-56
Manitoba.....	72,313-529	10,594-07	88,499-409	15,143-57
Ontario.....	2,346,528-522	379,692-68	2,565,456-794	381,276-01
Quebec.....	751,386-258	54,855-57	848,391-511	73,103-99
Nova Scotia.....	10,758-137	356-51	19,387-604	639-52
Jewellery and scrap.....	30,363-625	7,933-88	22,184-750	5,162-37
Foreign coin.....	16,934-077		279-202	0-99
Foreign mines.....			5-321	0-85
Total.....	3,603,329-943	520,928-52	3,933,446-326	549,919-94

Table 53. Precious Metals Consumed by the Jewellery and Silverware Industry in Canada, 1935 1936 and 1937

	Cost at works		
	1935	1936	1937
	\$	\$	\$
Fine gold†.....	820,453	777,532	957,094
Gold alloys.....	27,231	49,062	78,773
Fine silver.....	290,270	296,222	480,215
Silver alloys.....	73,457	47,175	414,474
Platinum.....	45,627	101,129	112,295
Old and scrap gold for refining (a).....	844,902	1,047,715	1,489,474
Jewellers' findings, waste and scrap for refining.....	265,656	422,837	388,146
Gold-filled wire and stock.....	132,174	121,517	137,964

† A considerable proportion of this gold is probably obtained from the refining of old and scrap gold (item a); also the 1936 and 1937 totals contain relatively small values of gold consumed by one company in the manufacture of regalia and society emblems.

PRECIOUS METALS MARKING ACT

"The safeguarding of the purity of precious metals when fabricated has, in the case of a majority of Governments, been under control. Prior to 1908, although measures were in existence in several countries requiring all gold and silver articles to be of a certain fineness before receiving the mark of approval of the country in which they were made, Canada was being flooded with inferior goods having all the appearance of the genuine articles and with marks of quality that were calculated to deceive the purchaser. As a result of the unfair competition created by such improperly marked goods, representations were made to the Government for the setting up of proper standards. With the object of protecting both the public and the manufacturer, the Gold and Silver Marking Act was passed establishing a standard for gold and silver as well as articles of gold and silver plate.

"The increasing use of platinum in the manufacture of jewellery necessitated its being brought under the provisions of the Act, which accordingly was amended in 1928 and the title changed to The Precious Metals Marking Act.

"An important requirement of the Act is that if an article is stamped with a mark of quality, then it must also be stamped with a trade mark registered in accordance with the Unfair Competition Act, 1932. In this manner responsibility for the quality stamp is fixed.

"Administration is effected mainly through the Inspector, whose duty it is to see that all articles coming under the Act made in, imported into or sold in Canada are of the standard required and that such articles must have applied to them marks that truly and correctly indicate the fineness of the metal employed in the manufacture of the articles.

"In the interest of more efficient administration of the Act, a list of all marks pertaining to articles of precious metals has been compiled from the records of the Trade Mark and Design Branch. This necessitated going carefully through over 63,000 marks and making a drawing of each mark registered for articles of precious metals, with full details of application."—4th Annual Report of Department of Trade and Commerce, Ottawa.

Table 54.—World's Monetary Stocks of Gold at the Close of 1936 and 1937 (Subject to revision)

(Compiled by the United States Mint from available data)
(Stated in United States money)

Country	Total Gold Stock Value, 1936 (f)	Per capita	Total Gold Stock Value, 1937 (f)	Per capita
	\$	\$	\$	\$
United States (e).....	11,257,626,000	87.66	12,760,151,000	99.04
Canada.....	187,357,000	16.91	183,603,000	16.51
Argentina.....	501,373,000	40.27	469,421,000	36.78
Belgium.....	631,907,000	76.13	597,070,000	71.67
Denmark.....	53,510,000	14.37	53,451,000	14.26
France.....	2,995,283,000	71.47	2,566,425,000	61.18
Germany.....	26,802,000	0.39	28,491,000	0.42
Great Britain.....	3,003,857,000	63.78	3,141,485,000	66.43
Italy.....	208,359,000	4.86	210,253,000	4.87
Netherlands.....	489,707,000	57.22	929,542,000	107.45
Norway.....	97,600,000	33.71	81,764,000	28.12
Poland.....	74,636,000	2.18	82,611,000	2.39
Portugal.....	68,284,000	9.45	68,653,000	9.40
Roumania.....	114,251,000	5.88	120,780,000	6.15
Russia (Soviet Union).....	(b)	(b)	(b)	(b)
Spain.....	(a) 718,000,000	28.89	525,000,000	21.13
Sweden.....	240,370,000	38.35	244,685,000	38.93
Switzerland.....	655,401,000	157.43	648,203,000	154.96
British India.....	274,975,000	0.74	275,014,000	0.74
Japan (including Chosen, Taiwan, Kwantung).....	462,657,000	4.65	261,390,000	2.56
Netherlands East Indies.....	60,274,000	0.92	(d) 79,338,000	1.20
Egypt.....	52,228,000	3.36	54,781,000	3.43
Australia.....	3,710,000	0.55	3,435,000	0.50
New Zealand.....	23,097,000	14.68	23,086,000	14.55
Union of South Africa.....	209,430,000	21.84	194,860,000	19.09
Other countries.....	(b) 736,561,000	.....	(b) 718,611,000	.....
Total.....	23,147,255,000	(c) 12.27	24,322,103,000	(c) 11.75

(a) On August 1st, 1936.

(b) Russian data omitted because of indefiniteness or unavailability.

(c) Population figures are principally from Yearbook of the League of Nations, 1936-37-38.

(d) January 1st, 1935.

(e) Includes Alaska, Hawaii and Puerto Rico.

(f) 1 ounce fine gold=\$35.

NOTE.—Is is understood that material amounts of gold are not reported by several countries, such as amounts held in secret funds for stabilizing currencies and those hoarded or held outside of regularly reported stocks.

Table 55.—Security Price Index Numbers, 1930-1937

(1926=100)

Month	Canadian Common Stocks						Dominion of Canada Long Term Bond Yields
	(a) Industrials and Utilities			(b) Mines			
	Common Stocks Total	Indus- tri-als	Utilities	Mines Total	Gold	Base Metals	
1930—December.....	103.1	120.3	104.7	59.2	57.8	.....	93.9
1931—December.....	64.8	74.3	59.3	59.0	59.0	.....	111.7
1932—December.....	52.2	58.9	45.7	63.1	62.7	.....	99.4
1933—December.....	75.3	111.4	47.8	105.1	100.4	127.1	95.1
1934—December.....	86.2	125.6	47.5	124.9	124.7	129.6	71.3
1935—December.....	107.4	178.2	50.1	133.6	116.9	201.7	75.5
1936—January.....	112.9	187.7	52.4	142.4	124.8	214.8	72.4
July.....	114.3	190.1	53.8	157.6	134.4	254.1	65.1
December.....	129.2	212.8	62.8	167.7	131.3	317.8	64.1
1937—January.....	137.4	222.0	68.5	174.6	137.5	329.6	64.6
February.....	142.4	228.8	73.1	177.2	139.4	344.8	68.4
March.....	147.2	241.7	71.0	172.6	133.0	340.5	72.7
April.....	136.2	224.1	64.1	154.1	120.0	288.0	73.2
May.....	132.2	216.4	63.0	142.1	111.3	269.3	71.0
June.....	129.4	210.1	63.2	134.7	105.9	255.0	69.3
July.....	133.0	217.8	63.9	141.8	109.2	278.9	69.0
August.....	135.2	221.6	65.2	146.2	112.5	287.4	68.1
September.....	118.9	193.3	57.4	127.6	103.5	224.5	68.3
October.....	105.8	170.3	51.7	121.6	104.3	192.4	69.7
November.....	103.1	166.3	49.6	129.4	113.8	192.4	68.8
December.....	103.7	167.7	49.5	134.3	115.5	213.1	67.4

Table 56. Toronto Stock Exchange

(J. Scott Rattray—Statistician)

In the following table is given the aggregate number of outstanding shares of all gold mining companies listed on the Toronto Stock Exchange, together with the total quoted market valuation at the end of each month. Total number of listed gold mining companies is also given and also the total number and valuation of all companies listed.

	Total Gold shares issued	Quoted market value	Number of companies	Total value of all stocks	Total number of all companies
		\$		\$	
1937					
December.....	340,731,289	588,437,464	115	4,634,921,102	505
November.....	337,753,288	558,050,599	114	4,564,801,294	505
October.....	334,778,615	552,242,013	113	4,815,754,541	504
September.....	332,119,116	557,459,096	112	5,088,418,356	501
August.....	329,508,720	557,235,373	111	5,787,117,667	500
July.....	328,636,491	577,042,932	111	5,831,493,585	495
June.....	334,574,134	550,037,531	113	5,544,081,545	494
May.....	334,309,014	593,223,079	113	5,746,453,229	492
April.....	340,066,012	629,641,339	115	5,656,439,810	489
March.....	334,309,014	748,424,741	113	6,346,618,238	483
February.....	328,011,335	769,968,157	111	6,449,788,634	472
January.....	321,416,950	784,967,553	108	6,124,012,227	459
1936					
December.....	318,706,459	649,897,133	107	5,911,748,332	456
November.....	323,160,928	745,299,233	108	5,698,862,911	455
October.....	319,224,597	684,681,527	107	5,559,627,068	453
September.....	312,734,856	695,149,066	105	5,343,542,314	449
August.....	305,518,659	710,925,595	103	5,119,409,480	446
July.....	382,146,544	718,920,996	100	5,070,774,341	440
June.....	289,480,554	659,127,288	97	4,918,496,545	433
May.....	280,383,743	668,705,960	95	4,905,923,047	429
April.....	270,937,912	581,682,322	93	4,712,799,705	425
March.....	260,361,073	559,583,988	89	4,895,792,639	418
February.....	258,420,560	574,180,219	89	5,033,416,906	420
January.....	249,420,948	572,841,887	88	4,932,847,066	421

THE ALLUVIAL GOLD MINING INDUSTRY IN CANADA

At the present time the greater part of the Canadian production of alluvial gold comes from the Yukon Territory and British Columbia; relatively small quantities are also obtained in Alberta and Quebec.

During 1937 a total of 112,574 crude ounces of placer gold was reported as being recovered in Canada. Employees engaged in alluvial gold mining totalled 1,069 and \$1,689,911 were distributed as salaries and wages. The cost of fuel, purchased electricity and process supplies consumed in 1937 by the entire industry amounted to \$176,560.

In Quebec a few men worked during 1937 on some of the placer deposits of the County of Beauce, and a small production of gold was reported. Information relating to the quantity of gold credited to Alberta is obtained from the Royal Canadian Mint, Ottawa, and particulars regarding its origin are not available.

Placer gold mining in British Columbia during 1937 was reported by 100 operators. Production of gold from alluvial deposits totalled 54,153 crude ounces and the industry distributed \$861,644 in salaries and wages to 618 employees. Consumption of fuel and process supplies amounted to \$137,561.

The British Columbia Department of Labour created in 1935 a plan whereby unmarried, physically fit unemployed men between the ages of 21 and 25 years were given an opportunity to learn placer mining. In 1936 the age limit was reduced, permitting younger men to enrol. Instruction was carried out under the direction of the Chief Mining Engineer. In 1937 about 255 young men between the ages of 18 and 25 were given instruction in placer mining, woodcraft, camp cooking, building cabins, whipsawing lumber, etc., during the summer months at the Nanaimo and Emory Creek camps. After the first training period of six weeks, those who desired to prospect for gold were given their fare, as well as a grub-stake and a special reduced cost on equipment, to certain areas where, in the opinion of the Department, there was a chance of discovering gold. Some of the larger mining companies kindly co-operated to the extent of giving some of these young men jobs in the mines and smelters after training.

The British Columbia Department of Mines reported that placer gold should show a further increase in volume and value of production, and it is interesting to note that more interest is being taken in placer mining in British Columbia in 1938 than for many years.

The following has been abstracted from the report of the Controller of the Yukon Territory for the fiscal year ending March 31, 1938:

"The total revenue collected at Dawson on account of mining lands was \$53,504.52; at Mayo, \$3,857.12; and at Whitehorse, \$1,548.74, making a total of \$58,910.38. This is a decrease of \$2,376.30 as compared with the previous year.

Placer Gold Mining

"The amount of placer gold mined during the year in the Territory, on which royalty export tax was paid, was 58,540.46 ounces, produced as follows: Dawson District 57,102.76 ounces; Mayo District 762.70 ounces; and Whitehorse District 675 ounces. The royalty collected was \$21,949.33. Gold production showed a decrease of 4,095.29 ounces as compared with the previous year. In the Dawson District 88 new placer location grants, 46 relocation grants, and 3,247 renewal grants were issued. Three dredging leases were renewed covering 23 miles. Six hydraulic leases were renewed.

"Yukon Consolidated Gold Corporation, Limited—The following is, in part, a review of the operations of this company during the year:

"Property—At the end of the year 1,652 placer mining claims, 6 hydraulic leases, 3 dredging leases, 9 water grants, and 2 timber berths were renewed and in good standing.

"Power Generation and Transmission—The hydroelectric power plant on the North Fork of the Klondike River generated a total of 25,049,530 k.w.h., an increase of 11.4 per cent over the preceding year. Of the total output 84.5 per cent was used in connection with placer mining operations. The remaining 15.5 per cent was sold to the Dawson Utility Companies which provide Dawson with light, water and telephone service.

"A total of \$70,600 was expended in additions and repairs to the ditch system which conducts water to the power plant. Widening of the six mile section from the North Fork River to the power plant has been completed and the lower bank has been further strengthened to take care of the increased amount of water to be carried.

"Prospect Drilling—Two gasoline driven caterpillar drills were operated continuously from April 22 to September 30, for examination of various areas. An estimated total of 22,124,000 cubic yards of dredging ground was added to the company's proved reserves. Frozen muck overburden was removed by hydraulic stripping at various locations and water thawing was continued at Upper Dominion and Granville and plants were started at Arlington, Middle Dominion and Middle Sulphur Creeks, all water used being re-circulated by electrically driven centrifugal pumps.

"Dredging operations resulted in an output of 36,849·654 fine ounces of gold and 8,814·02 fine ounces of silver during the year; and 48,770 ounces of bullion were sold to the Dominion Mint on which an export tax of \$18,289 was paid. The number of men employed varied from an average of 512 during the operating season to an average of 131 for the period November 15 to December 31; a total of \$1,020,404 was expended for salaries, wages and board. Seven dredges were in operation and 7,443,785 cubic yards were dredged; construction of a new dredge, No. 8, was commenced on Middle Sulphur Creek. The earliest dredging operations during the year were commenced by dredge No. 7 on April 27 at Quartz Creek and the latest closedown was that of Dredge No. 2 on December 3, at Klondike River.

"Other Yukon Placer Operations—The dredge on the Sixtymile River, operated by the Holbrook Dredging Company, started operations on August 1 and continued until November 22, handling 182,211 cubic yards of material. A total of 3,228·79 crude ounces of gold was recovered, the value being \$90,503.20. The number of men employed was 29.

"Ground on Black Hills Creek is being operated by individual miners.

"Satisfactory results are reported from placer operations on Haggart Creek where Mr. E. Barker and associates are installing additional equipment. Prospectors have also been active in other parts of the Mayo district and in the Kluane district.

"Prospecting Leases—Prospecting Leases representing a total of 64 miles were issued during the year on the following watercourses: All Gold, Barlow, Right Fork Clear, Haggart, Geary, Silver, Kirkman, Bonanza, Moose, Duncan, Eureka, Clear, Ruby, Glacier, Canadian, Left Fork Clear, Shootanook, Twelfth of July, Scurvey, Bullion, Sixtymile, Selwyn, Black Hills, Sheep, and Dublin Gulch.

Table 57 —Summary Statistics of Alluvial Gold Mining in Canada, 1936 and 1937

	1936			1937		
	British Columbia	Yukon	Nova Scotia, Quebec and Alberta (d)	British Columbia	Yukon	Quebec and Alberta
Number of firms and individual operators (*)	74	3	3	100	3	3
Capital employed..... \$	4,415,737	6,549,787	(c)	4,552,173	7,363,027	4,737
Number of employees.....	524	325	4	618	420	31
Salaries and wages paid..... \$	724,510	791,907	3,242	861,644	811,310	16,957
Fuel and electricity used (purchased)...	53,064	57,113	15	61,926	36,279	867
Process supplies used..... \$	43,150	14,235	.....	75,635	781	1,072
Electricity generated for own use..... K.W.H.	1,574,026	18,258,532	.....	2,070,630	21,190,912	.....
Electricity generated for sale..... K.W.H.	(c)	(c)	(c)	16,795	3,858,618	.....
Crude gold recovered..... crude ounces	43,389	62,740	147	54,153	58,349	72
Platinum recovered..... crude ounces	20	.....	.....	22	.....	.....
Value of platinum recovered..... \$	809	.....	.....	1,066	.....	.....
Quantity of material handled..... cu. yds.	2,083,934	8,067,159	(c)	3,472,025	8,298,514	(c)
Length of ditches..... miles (b)	78	73	(c)	147	71	.....
Total value of alluvial products (a)..... \$	1,250,412	1,806,912	4,234	1,560,672	1,680,451	2,073

(*) In addition to the number shown in the table, there were numerous small operators from whom returns were not obtainable.

(a) Value of crude gold in Canadian funds was estimated at \$28.80 per crude ounce.

(b) Includes flume.

(c) Information not available.

(d) Recoveries for Alberta represent receipts of crude gold from Alberta at the Royal Canadian Mint, Ottawa.

THE AURIFEROUS QUARTZ MINING INDUSTRY IN CANADA

The great part of the gold of Canada comes from the Canadian Shield, an immense area of precambrian rocks extending from the Labrador Coast westward almost to the mouth of MacKenzie river. The area of the shield is roughly 1,825,000 square miles, almost half of Canada. The deposits of the shield are of two main types, namely, quartz veins, from which most of the gold, up to the present time, has been won, and sulphide deposits which produce a smaller, but increasing proportion. The second great source of gold in Canada has been the Western or Cordilleran section, comprising British Columbia and Yukon territories; the gold production from this section includes relatively large quantities obtained from alluvial deposits. The third principal area in which gold deposits occur is the Acadian region of Eastern Canada, the metal occurring principally in Nova Scotia where it has been mined since 1862.

In 1937 the Dominion Bureau of Statistics, Ottawa, received reports from 631 operators (firms) in the Canadian auriferous quartz mining industry compared with 580 in 1936, representing an increase of 9 per cent. During the year under review, 659 properties were operated as against 607 in the preceding year. In 1937 mines reporting production totalled 189 compared with 33 in 1923 and 37 in 1930.

The gross value of output as recorded for the entire industry totalled \$122,676,105 in 1937 compared with \$108,093,017 in 1936. Of the 1937 value, \$88,061,419 were contributed by the gold mines of Ontario, \$15,064,326 by those in Quebec, and \$15,776,492 by properties located in British Columbia.

Employees totalled 29,140 in 1937, an increase of 16 per cent over 1936 and salaries and wages distributed increased from a total of \$39,826,742 in 1936 to \$48,219,318 in 1937.

Fuel and purchased electricity used in 1937 were valued at \$7,345,401 and the cost of explosives, chemicals and other process supplies consumed during the same period amounted to \$16,230,722.

Dividends paid during 1937, as computed from actual returns made by the lode gold mining industry, totalled \$38,827,609.

Nova Scotia.—The annual report on mines for 1937 by the Department of Public Works and Mines, Halifax, states—"Progress in the gold mining industry in Nova Scotia has been most decided during the past few years. This, no doubt, has been due in no small measure to the increased price of gold and a considerable interest in the influx of outside capital. The foregoing reasons have supplied the necessary incentive to reopen many of the more promising districts of the province, and to-day by means of modern mining methods Nova Scotia is rapidly forging ahead in gold production. The extent of the revival in this industry is apparent when it is considered that the gold production for 1937 was nearly twenty times that of 1933. There are to-day nineteen gold mining enterprises in Nova Scotia of which eleven are contributing to the production of gold, six more are under investigation either by underground work or by diamond drilling, and one new treatment plant is operating upon an old tailings bed.

"The Government of Nova Scotia, in co-operation with the Youth Employment Commission of the Department of Labour, Ottawa, has established an apprenticeship system to train unemployed youth in the various branches of industry as part of this plan at the present time (March, 1938) about one hundred men are employed at the Lacey mine at Chester Basin, Nova Scotia, and are being trained in hard rock mining. The young men included in the project are selected initially from those who are unemployed throughout the province and who appear upon examination to be best fitted for this class of work. The apprentices receive free board, free instruction and equipment and are paid a rate beginning at fifty cents a day. The age limit is from nineteen to twenty-five years . . ."

Quebec.—The following notes on the gold mines of western Quebec have been abstracted from the periodical reports made by the Inspector of Mines for the Rouyn-Harricana district—R. H. Taschereau, Quebec Bureau of Mines—

"The year 1937 was most satisfactory for the mines working straight gold ore deposits; practically all the producing gold mines show substantial increases in output and in the scope of their operations, as compared with 1936.

DOMINION BUREAU OF STATISTICS

"The Beattie mine has been hoisting up to 1,750 tons a day, and its mill, which has a rated capacity of 1,500 tons a day, has treated as high as 1,700 tons. The roasting plant, which it was planned to erect, was constructed in 1937 and started to operate in October. The arsenical concentrate is now all roasted at the mine instead of being shipped to the Tacoma smelter. The O'Brien mine has also a roaster operating since 1935, and in 1937 its capacity was doubled. This mine is now hoisting 150 tons a day, as compared with 100 in 1936.

"Among other mines which have increased their mill capacity during the year may be mentioned: Lamaque to 1,000 tons; Sigma, to 520 tons; Stadacona to 300; Canadian Malartic to 700; Siscoe to 600; Shawkey to 150; Thompson Cadillac to 200.

"Powell-Rouyn mine, in Rouyn township, is producing 250 tons a day of an ore containing 50 per cent silica. It is hauled to the Noranda smelter by trucks, which are loaded from the shaft bin.

"The Cournor mine, in Louvicourt township, formerly operated by the Bussi res Mining Company, remodelled the cyaniding plant, and the mill was started in August, 1937. It is now treating 150 tons a day.

"On the Quebec Manitou Gold Mines' property, in Bourlamaque township, formerly held by the Caribou Copper Corporation, a diamond drilling campaign has indicated the presence of a substantial ore body containing zinc and gold. A three compartment shaft was started in the fall of 1937 and had reached a depth of 370 feet in January, 1938, with an objective of 400 feet.

"Great activity prevailed in the Cadillac-Malartic region, where it is expected some new properties will reach the production stage in 1938. Wood-Cadillac mine has a three compartment shaft which is down over 400 feet and drifting has been started on the 250-ft. level. Central-Cadillac is drifting on 100-ft. and 200-ft. levels. East-Malartic has a 4-compartment shaft down to 300 feet, and it is reported that plans for a mill are being prepared. Kewagama Gold Mines has deepened the shaft on its property to 500 feet and drifting is proceeding on three levels. Sladen-Malartic's shaft is down 538 feet; levels are established at 200, 350 and 500 feet. A mill plant was being erected and equipped at the end of 1937, with a reported capacity of 250 tons of ore.

Bill No. 43, an Act to aid youth to profit from the new careers offered by the development of the mining industry was introduced into the Quebec legislature in April, 1937; the Act reads—"The Minister of Mines and Fisheries is authorized to expend a sum of twenty-five thousand dollars to aid the youth of the province in their attainment of a profession in order to enable them to benefit from the opening of new careers in the mining industry.

"Such sum shall be paid by the Provincial Treasurer out of the consolidated revenue fund."

During the fiscal year 1936-37 the Quebec Bureau of Mines appreciably extended the network of roads built to serve the mining regions of the Province. By the end of June, 1937, these roads had reached a total length of 724.55 miles, or 194 miles more than in June, 1936. The cost of roads built during the year was \$586,403.46 which brought the total cost of mine roads constructed to the end of June, 1937, to \$3,137,168.10 as compared with \$2,551,764.64 to the end of June, 1936.

The mine roads constructed, improved and maintained during the year may be classed as follows:

1. Roads constructed and improved with funds from the Bureau of Mines appropriations.
2. Roads constructed and improved in virtue of an agreement between the Federal Government and the Government of the Province of Quebec, whereby the former paid two-thirds of the cost and the latter one-third.
3. Winter roads opened and maintained at the expense of the Bureau of Mines.

Ontario.—Development and exploration programmes were intensified throughout the gold bearing areas of Ontario in 1937. The following information has been summarized from a report prepared by Mr. A. C. Young of the Ontario Department of Mines—

"In the Porcupine area the Hollinger commenced a large programme of alterations in the milling department, which included a complete new crushing plant and the construction of a unique 11,000 ton ore bin of hemispherical design. The Paymaster, Buffalo-Ankerite and Pamour deepened their shafts. Coniaurum and Dome mines completed internal shafts to the 5,100 foot and 29th levels respectively. Hallnor commenced work on a 400 ton mill; the Delnite started milling in July and the Moneta brought its 200 ton mill into production in January, 1938.

"Some of the more interesting developments along the Kirkland-Larder Lakes belt included the construction of a 100 ton mill at the Golden Gate mine; the completion of shaft No. 5 at the Lake Shore to the 3,575 foot level and the development of ore at the 5,400 foot level of the Wright-Hargreaves mine. The Raven River mine, formerly the Harris-Maxwell, brought its 60 ton mill into production and the Kerr-Addison advanced construction on the first unit of a 500 ton mill. Important development work in these areas was also conducted at the Argonaut, Martin Bird, Barber Larder, Fernland, Chesterville, Lakeside, Upper Canada, Ritchie, and several other promising properties.

"In the Algoma district construction of a 250 ton cyanide mill was commenced at the Cline Lake mine.

"The Long Lac-Beardmore area was most active in 1937 and the prospects are that 10 mines in this section will be producing gold in 1938. Little Long Lac increased its tonnage to 300 tons daily; at the close of the year Sand River mine, adjoining the Leitch, commenced producing with a 50 ton plant; Hard Rock was constructing a 200 ton mill, McLeod-Cockshutt one of 500 tons and Tombill a 100 ton flotation plant.

"In the Kenora-Rainy River-Patricia districts many mining properties were active. Near Lake of the Woods the Kenricia mine operated until December and then closed temporarily pending completion of mill plans. At Red Lake a 125 ton cyanide mill was erected at the Gold Eagle property; at the Madsen Red Lake development was completed to 500 feet and plans made for a mill. An important development was the deepening of the shaft to 633 feet at the Uchi Lake mine together with the installation of new mining plant. The Central Patricia and Pickle Crow mines deepened their shafts to 1,440 feet and 1,700 feet respectively. The most northerly development in Ontario gold mining during 1937 was that of the Sachigo River Exploration Co. at Sherman Lake near the Manitoba boundary and about 350 miles north of Sioux Lookout; the ore in Number 1 vein was reported to run as high as 3.45 ounces per ton and plans were made for construction of a mill."

Manitoba.—A summary review of the auriferous quartz mining industry in Manitoba by Geo. E. Cole, Director of Mines, follows—

"The production of gold in Manitoba during 1937 totalled 160,428 fine ounces, as compared with 139,273 fine ounces for 1936.

"The year 1937 was marked by the addition of one producer, Gurney Gold Mines, Limited, some 12 miles northeast of Cranberry Portage. This mine began production operations about the middle of October and at the end of the year had produced gold to the value of \$60,580.

"Increases in production were noted at the God's Lake Gold Mine, where the mill tonnage was increased to 195 tons a day. At the Gunnar mine, operations were carried on throughout the year showing considerable increase; as, for the year 1936, production operations only commenced in the month of June.

"Developments at the old Rex mine, now the Laguna, at Herb Lake, were satisfactory throughout the year and the company was able to increase the capacity of its mill to 90 tons a day. Production for 1937 was, therefore, considerably increased in view of operations for the complete year and the increase in tonnage milled.

"During the year the San Antonio and Gunnar companies paid dividends to the shareholders, the latter marking its entry into the dividend-paying list. The year 1938 gives promise of at least one more dividend-payer, if not two.

"Prospecting for precious metals received a set-back early in the year, owing to unsettled conditions in the money markets of the world and particularly those of Eastern Canada and the United States, from which prospecting in the Precambrian area draws the greatest part of its support.

"During the year the Department of Mines and Resources, Ottawa, had three parties working on the geological formations in the gold-bearing areas of the Province."

Saskatchewan.—"The production of gold in Saskatchewan during 1937 amounted to 65,886 ounces, as compared with 48,981 ounces in 1936. This increase is attributed to a new mine owned by Monarch Gold Miners Syndicate coming into production early in 1937 on the West shore of Amisk Lake and to additional ore recovered from that part of the Flin Flon ore body in Saskatchewan by the Hudson Bay Mining & Smelting Company Limited.

"As soon as a roaster can be installed at the Flin Flon Gold Mines property at Douglas Lake, this mine will produce. Sufficient underground work has been done to place this mine on a production basis.

"Henning Maloney Gold Mines Limited have 28 mineral claims four miles southwest of the Hudson Bay Mining & Smelting Company plant at Flin Flon. A plant and machinery was erected on the "Ann" claim, consisting of a two-compartment shaft, 150 feet deep, over 1,000 feet of drifting and crosscutting and two raises of 112 feet each.

"The discovery of gold ore by Adolph Studer at Sulphide Lake near Lac la Ronge in 1936 is being prospected and diamond drilled. In the late fall of 1937 further gold bearing ores were discovered and staked in the immediate vicinity by successful prospectors well known in other provinces of Canada and the Northwest Territories.

"At Goldfields, Lake Athabaska, the Athona sample mill did not operate and work on the Consolidated Mining & Smelting Company 1,000 ton mill and 6,600 h.p. hydro-electric plant was somewhat hampered due to prevailing low water conditions, which prevented transportation of much equipment in the navigation season. It is expected that the mill will come into production by the late summer of 1938. Athona Mines (1937) Limited continued to prospect their holdings throughout the year and may produce soon after the property of the Consolidated Mining & Smelting Company Limited comes into production.

"Other companies holding properties in the Lake Athabaska region continued to carry out surface work and diamond drilling, among which is Nicholson Mines Limited, who commenced a shaft along a pitchblende showing carrying gold values.

"The Fondulac Mining Corporation is sinking two prospect shafts, 2,000 feet apart at Norite Bay, a tractor road has been cut and a camp located two miles north of the Bay.

"Two recent reports issued as a result of work by the Geographical Survey, Ottawa, in 1937, are now available, indicating further valuable prospecting ground in the Cree Lake and Mudjatik Lake areas."—(By E. Swain, Supervisor of Mines, Saskatchewan.)

British Columbia.—Notes on Lode Gold Mining operations in British Columbia during 1937—(By Dr. John F. Walker, Deputy Minister of Mines, British Columbia.)—

"The Polaris-Taku Mining Co. Ltd., operating the Whitewater Taku on Tulsequah River, Atlin Mining Division, completed a 150-ton mill late in 1937, and production of concentrates was commenced in November last. The concentrates are stored until spring when weather conditions permit the shipping of same. In the Portland Canal area the Big Missouri, owned by the Buena Vista Mining Co., Ltd., which is controlled by the Consolidated Mining and Smelting Company of Canada, Ltd., carried on development work and the construction of a 750-ton underground mill, which was completed in April, 1938, and the first gold brick was reported to have been shipped on May 5. The Silbak Premier produced steadily, and mined and milled a total of 201,206 tons of ore. In the Skeena Mining Division the Surf Point mine, owned by the Reward Mining Co. Ltd., continued steady operations, and the Edye Pass mine owned by the same company shipped a small tonnage. The Surf Inlet Consolidated Gold Mines, Limited, also continued steady operations.

"In the Cariboo District, the Cariboo Gold Quartz Mining Company, Ltd., and the Island Mountain Mines, Ltd., operated steadily, with the exception of a short period during the summer, when both properties were closed owing to labour troubles, but these were amicably settled and operations resumed. The milling capacity of the former mine was raised from 225 tons in April to 250 tons in September, and in February 1938 was again raised to 275 tons. The tonnage treated in 1937 was 69,324. The tonnage treated by the Island Mountain Company was 33,903.

"In the Similkameen and Osoyoos area, the Kelowna Exploration Company Ltd., operating the Nickel Plate mine, treated 77,887 tons of ore producing 5,165 tons of concentrates together with precipitates for exporting. The Hedley Mascot Gold Mines, Limited, continued steady operation, mining and milling 59,115 tons of ore and 6,526 tons of concentrates produced and exported. At Oliver the Fairview Amalgamated Gold Mines, Ltd., mined and milled 34,885 tons of ore. Osoyoos Mines has installed a cyanide plant to treat its flotation tailings and is also retreating a considerable tonnage of tailings previously discarded. The Gold Mountain Mines Ltd., near Hedley, ceased operations at the end of April.

"In the Nelson area, operations were conducted at numerous properties, and development conducted on an extensive scale. The main producers are the Reno, Second Relief, Ymir Yankee Girl, Sheep Creek, Kootenay Belle, Bayonne, and Clubine Comstock. The Durango (formerly the Howard) Mines, Ltd., mill commenced to treat ore in December.

"In the Bridge River area, Lillooet Mining Division, the Bralorne carried out extensive development, and the mill treated 170,686 tons of ore. The Pioneer Gold Mines, Ltd. mined and milled 130,864 tons and a progressive development programme was carried on. The Minto Gold Mines, Ltd., after milling 32,556 tons, ceased operation. A small tonnage from the Congress and Wayside mines was treated in the Wayside mill, under a lease by the Bealmore Milling Company, but ceased owing to financial difficulties.

"The Vidette Gold Mines, Ltd., near Savona in the Clinton Mining Division, carried on operations until the end of November, and during the period a total of 11,016 tons were treated in the mill. Operations recommenced in January, 1938.

"The Ashloo Gold Mines, Ltd., operating near Squamish, in the Vancouver Mining Division, carried on operations and a programme of development was proceeded with.

"At Zeballos, on the West Coast of Vancouver Island, numerous properties are being explored. Several properties made shipments during 1937, the principal one being the Privateer, controlled by the Privateer Mines, Ltd.

"The British Columbia Department of Mines, Victoria, has issued a report on the area by John S. Stevenson entitled "Lode-Gold Deposits of the Zeballos Area". A copy may be obtained by writing to the Deputy Minister of Mines, Victoria, B.C."

Yukon.—In the Mount Freegold area a small mill was installed on the Broun-Fairclough group by the Mt. Freegold Yukon Mines Ltd., and operated a brief period. Seventy quartz grants were issued in the Dawson district during 1937 and 342 claims were renewed.

Northwest Territories.—(By Dr. A. W. Joliffe, Department of Mines and Resources, Ottawa.)—"Interest in lode gold deposits in the Northwest Territories is centered chiefly around Great Slave Lake. The districts in which most prospecting and development work have been carried on include: Snare River, Yellowknife, North Yellowknife, Gordon Lake and Outpost Islands. The data below are for the period January 1, 1937, to March 31, 1938. No gold was produced in this time but several properties are expected to come into production during 1938.

"Snare River.—In the early summer of 1937 the Deloro group of 19 claims was staked on behalf of B. and M. syndicate on Snare River about 40 miles north of Rae. The main vein on this group is reported to consist of stringers of quartz in dark grey schist carrying scattered crystals of arsenopyrite. Channel samples across 4 feet throughout a length of 50 feet are stated to have yielded an average value of 0.39 ounces gold to the ton.

"Yellowknife.—Consolidated Mining and Smelting Company of Canada, Limited, sank a 3-compartment vertical shaft to a depth of 500 feet on Con group and erected a 100-ton mill. This company also acquired control of the adjacent P and G group (under development by Ryan Gold Mines Limited) and on this property a 3-compartment vertical shaft was sunk to a depth of 250 feet. Between 100 and 150 men were employed by the company in the Yellowknife area during 1937.

"Negus Gold Mines, Limited, completed 28 diamond drill holes and started an inclined prospect shaft on Negus group of 6 claims lying immediately south of Con and P and G groups. It is reported that a 50-ton mill will be installed this summer.

"Anglo-Huronian Limited and Howey Gold Mines Limited obtained control of 20 claims and a fraction comprising the Giant group. Surface sampling in the spring of 1937 on the "O vein" is reported to have shown an average of 0.5 ounces gold to the ton across 13½ feet for a length of 250 feet. During the summer of 1937 an inclined prospect shaft was sunk to a depth of 85 feet in this vein and in the winter the vein was diamond drilled. These companies also control the Viemac groups totalling 65 claims on which diamond drilling was started.

"Many other companies are engaged in development work in Yellowknife district, including Burwash Yellowknife Mines, Limited; Chan Yellowknife Gold, Limited; and Oro Plata Mining Corporation.

"North Yellowknife.—In August, 1937, prospectors for Territories Exploration Limited staked a block of more than 200 claims around gold discoveries northeast of Yellowknife River, 35 miles north of Yellowknife Bay. A few miles to the southwest Consolidated Mining and Smelting Company of Canada, Limited, made further discoveries a few months later. These and adjacent properties are under active development.

"Gordon Lake.—Camlaren Mines Limited concentrated development work on the "Hump" vein, the original gold discovery on Gordon Lake. Five diamond drill holes put down during the spring of 1937 intersected the vein above a vertical depth of 130 feet and are reported to have indicated an ore shoot 200 feet long averaging 7.7 feet wide and of an average uncut grade of 1.61 ounces or a cut average of 1.25 ounces of gold to the ton. By the end of March, 1938, a shaft had been completed to a depth of 200 feet and 66 feet of drifting on this level is reported to have indicated an average grade of an ounce of gold to the ton across a width of 33 inches. The installation of a 50-ton mill on this property is said to be contemplated. During 1937 a winter road was constructed from Yellowknife Bay to Gordon Lake.

"McVittie-Graham Mines, Limited, carried on surface developments on a group of 9 claims in which they have a controlling interest. They report a strong shear on these claims in which gold values have been obtained at intervals in a total length of 1,900 feet. The best sections from careful surface sampling of trenches after all visible gold had been eliminated are stated to be as follows:

Length (feet)	Width (feet)	Values (ounces gold to the ton)
225	2.2	0.46
55	1.6	0.17
90	2.3	0.38

"Many other companies engaged in prospecting and initial development work (including some diamond drilling) around Gordon Lake and around Victory Lake 15 miles to the south.

"Outpost Islands.—Slave Lake Gold Mines completed a 2-compartment vertical shaft to a depth of 450 feet with levels established at 50, 125, 250, 325 and 425 feet. Drifting on the lower levels is reported to have failed to develop a mineable ore shoot. The option with Timmins Corporation was cancelled in March, 1938.

"In the spring of 1937 Ventures Limited did 4,000 feet of diamond drilling on claims which adjoin the property of Slave Lake Gold Mines.

Table 58 —Principal Statistics of the Auriferous Quartz Mining Industry in Canada, for Years Specified

	Number of active operators	Number of operating plants or mines	Capital employed	Number of employees	Salaries and wages	Cost of fuel and electricity	Cost of process supplies used (b)	Value of freight paid on shipments of ore, slag, etc.		Smelter and refinery treatment costs	Gross value of bullion, ore, concentrates or residues shipped from mines		Net value of bullion, ore, concentrates or residues shipped from mines
								\$	\$		\$	\$	
1923.....	65	65	77,574,976	5,524	8,961,434	1,497,197	Data not available	Data not available			25,021,837		Data not available
1929.....	80	85	135,166,105	8,660	14,258,733	2,579,481	Data not available	Data not available			37,275,986		Data not available
1936—													
Nova Scotia.....	35	39	1,966,452	639	545,836	82,367	191,868	Data not available		Data available	380,678		106,443
Quebec.....	175	179	46,135,243	4,043	5,760,422	1,076,498	1,428,682				10,984,718		7,979,538
Ontario.....	215	224	175,619,052	15,912	26,466,946	4,108,912	9,043,422				80,817,672		67,665,338
Manitoba.....	21	21	8,961,463	817	1,389,048	236,256	487,766				2,644,074		1,920,052
Saskatchewan.....	4	4	209,444	82	124,513	23,292	50,809				1,616		(-72,485)
British Columbia.....	128	138	23,961,955	3,882	5,508,111	544,240	2,097,772	Data not available		Data not available	13,264,259		10,622,247
Northwest Territories.....	2	2	163,969	22	31,866	4,800	6,100				.....		(-10,900)
Canada.....	550	607	256,018,578	25,097	39,826,742	6,076,365	13,806,419				108,093,017		88,210,223
1937—													
Nova Scotia.....	19	20	1,384,240	485	516,987	91,076	251,247	(a)		4,775	685,478		338,380
Quebec.....	253	257	64,048,672	5,476	8,079,743	1,496,327	2,485,507				15,064,326		10,760,153
Ontario.....	214	222	167,523,907	18,315	31,854,330	4,723,859	10,549,707				88,061,419		72,761,393
Manitoba.....	15	15	9,675,994	842	1,399,884	269,726	494,583				3,057,649		2,292,148
Saskatchewan.....	8	9	1,114,463	266	310,305	76,455	66,766				30,741		(-115,229)
British Columbia.....	117	130	23,440,161	3,631	5,848,778	650,087	2,308,769	Data not available		448,273	15,776,492		12,036,447
Northwest Territories.....	5	6	1,958,212	125	209,291	37,871	74,143				.....		(-112,014)
Canada.....	631	659	269,145,649	29,140	48,219,348	7,343,401	16,230,722				122,676,105		97,961,278

NOTE.—The value of fuel, purchased electricity and process supplies used was deducted from the value of shipments for the first time in 1935; this was done in order to attain a more accurate approximation of a net value.

(a) Data not available.

(b) Explosives, chemicals, etc.

Table 59—Ores Mined and Milled, Crude Bullion Recovered and Crude Bullion and Concentrates shipped by the Auriferous Quartz Mining Industry, 1937

(Ton=2,000 pounds)

	Nova Scotia	Quebec	Ontario	Manitoba	Saskat- chewan	British Columbia	North- west Terri- tories	Canada
Number of producing mines....	15	20	68	8	1	77	(b)	189
Ore mined..... tons	149,654	2,048,619	8,658,860	299,108	2,047	1,230,201		12,388,489
Material discarded (sorted) tons	24,244	144,241	210,494	16,492	478	61,673		457,622
Ore milled..... tons	128,351	1,921,179	8,371,974	283,011	1,569	1,174,239		11,880,323
Tailings retreated..... tons		765	50,125	25,388		21,432		97,710
Concentrates produced..... tons	960	22,819	1,098			42,072		66,949
Gold content of ores and con- centrates shipped—								
To Foreign smelters... fine oz.	289	14,433	2,164	226		155,689		172,801
To Canadian smelters fine oz.		4,599	2,008	44	181	26,742		33,574
Bullion recovered by amalgamation..... crude oz.	18,776	138,291	283,721	33,735	920	157,444		632,887
Bullion recovered by cyanidation..... crude oz.	2,272	414,290	2,978,068	98,123		216,905		3,709,658
Total bullion re- covered..... crude oz.	21,048	552,581	3,261,789	131,858	920	374,349		4,342,545
Content of bullion shipped—								
Gold (f)..... fine oz.	19,388	414,680	2,506,618	86,936	736	255,437		3,283,795
Silver..... fine oz.	640	73,642	486,511	15,222	172	92,403		668,590
Value..... \$	401,068	8,604,097	52,022,764	1,803,720	15,287	5,318,904		68,165,840
Exchange premium on bul- lion..... \$	277,794	5,836,349	35,890,822	1,244,317	10,528	3,646,474		46,906,284
Value of ores, slags and resi- dues sold..... \$	6,616	623,880	147,833	9,612	4,926	6,811,114		7,603,981
Total gross value of all shipments..... \$	685,478	15,064,326	88,061,419	3,057,649	30,741	15,776,492		122,676,105
Value of fuel, electricity and process supplies used, also freight on shipments and smelter charges..... \$	347,098	4,304,173	15,300,026	765,501	145,970	3,740,045	112,014	24,714,827
Net value of ship- ments..... \$	338,380	10,760,153	72,761,393	2,292,148	(-115,229)	12,036,447	(-112,014)	97,961,278

(a) Less freight and treatment charges.

(b) Information not available.

(f) Includes recovery data for some properties.

Table 60 —Ores, Concentrates and Slags Shipped from the Auriferous Quartz Mines in Canada, 1937

Item	Nova Scotia, Quebec, Ontario and Manitoba mines shipping		British Columbia mines shipping		Canada
	To Canadian smelters	To Foreign smelters	To Canadian smelters	To Foreign smelters	
Number of mines.....	22	7	37	29	95
Tons of ore, etc., shipped.....	30,792	22,954	13,445	42,623	109,814
Metal content—					
Gold..... oz.	6,832	17,112	26,742	155,689	206,375
Silver..... oz.	13,140	15,171	136,661	1,078,724	1,243,696
Copper..... lb.	2,913	182,514		1,240,121	1,425,548
Lead..... lb.			2,752,755	41,453	2,794,208
Antimony..... lb.		48,163			48,163
Value—Gross..... \$	215,921	576,946	988,884	5,822,230	7,603,981

Table 61 —Specified Costs per Ton of Ore Milled at Certain of the Principal Auriferous Quartz Mines in Canada, 1937

Name of mine	Develop- ment and exploration (a)	Mining	Milling	General (b)	Total cost per ton (c)
NOVA SCOTIA					
Seal Harbour Gold Mines Ltd.....	\$ 0.4117	\$ 1.2294	\$ 0.7799	\$ 0.5126	\$ 2.9336
QUEBEC					
Arntfield Gold Mines Ltd.....	1.39	2.35	0.99	0.90	(1) 5.63
Beattie Gold Mines Ltd.....	0.344	0.617	0.917	0.764	2.642
Canadian Malartic Gold Mines Ltd.....	0.60	0.91	0.72	0.40	2.63
Lamaque Mining Co. Ltd.....	3.46	2.28	0.83	1.60	8.17
McWatters Gold Mines Ltd.....	2.603	1.910	1.690	1.223	7.426
O'Brien Gold Mines Ltd. (2).....	1.79	3.43	2.17	2.26	(4) 9.65
Perron Gold Mines Ltd.....	1.123	2.512	1.023	0.535	5.193
Sigma Mines Ltd.....	1.270	1.784	0.963	1.792	(3) 5.809
Siscoe Gold Mines Ltd.....	0.855	2.019	1.047	0.834	(4) 4.755
Sullivan Consolidated Mines Ltd.....	4.56	1.56	1.47	0.53	(5)
ONTARIO					
Porcupine District—					
Buffalo Ankerite Gold Mines Ltd.....	0.608	2.139	0.830	0.628	4.205
Hollinger Consolidated Gold Mines Ltd.....	0.9556	2.5181	0.6579	1.2870	5.4186
McIntyre Porcupine Mines Ltd.....	0.610	3.318	0.755	0.989	5.672
Pamour Porcupine Mines Ltd.....	1.69	1.50	0.77	0.32	4.28
Paymaster Consolidated Mines Ltd.....	1.69	2.72	1.03	0.33	5.77
Kirkland Lake District—					
Bidgood Kirkland Gold Mines Ltd.....	4.04	3.79	1.62	1.03	10.48
Kirkland Lake Gold Mining Co. Ltd.....	1.17	3.14	1.31	1.53	7.15
Macassa Mines Ltd.....	2.40	1.82	1.46	0.94	(6) 6.62
Omega Gold Mines Ltd.....	0.572	1.989	1.234	0.015	3.810
Sylvanite Gold Mines Ltd.....	1.878	2.156	1.073	0.950	(12) 6.057
Teck Hughes Gold Mines Ltd.....		(8) 3.41	1.03	1.65	6.09
Wright-Hargraves Mines Ltd.....		(9) 4.431	1.187	2.604	8.222
Other Properties—					
Bankfield Consolidated Mines Ltd.....	2.328	3.789	1.913	1.833	(10) 9.863
Central Patricia Gold Mines Ltd.....	2.60	2.17	2.05	2.21	9.03
New Golden Rose Mines Ltd.....	2.003	5.465	2.132	0.094	9.694
Young Davidson Mines Ltd.....	0.2588	1.0674	0.6218	0.3490	2.2970
Little Long Lac Gold Mines Ltd.....	1.2064	3.3536	1.8962	2.3989	8.8551
Matachewan Consolidated Mines Ltd.....	1.387	1.637	0.982	0.562	4.568
Red Lake Gold Shore Mines Ltd.....	1.73	2.82	1.91	0.92	7.38
Wendigo Gold Mines Ltd.....	1.43	5.62	2.27	0.44	9.76
MANITOBA					
Central Manitoba Mines Ltd.....	3.37	3.57	2.01	0.83	9.78
God's Lake Gold Mines Ltd.....	2.188	2.552	1.771	1.340	7.851
Laguna Gold Mines Ltd.....	2.80	6.15	2.38	1.10	12.43
BRITISH COLUMBIA					
Bralorne Mines Ltd.....	1.1975	3.2235	0.7044	1.6822	6.8076
Hedley Mascot Gold Mines Ltd.....		1.52	1.83	3.86	(11) 7.21
Home Gold Mining Co. Ltd.....	4.00	2.00	1.50	0.50	(11) 8.00
Kootenay Belle Gold Mines Ltd.....	1.62	3.98	1.58	0.84	8.02
Reward Mining Co. Ltd.....	0.70	5.45	(11) 2.89	2.32	11.36
Sheep Creek Gold Mines Ltd.....	2.129	2.399	1.448	0.918	6.894
Wesko Mines Ltd.....	0.532	3.196	2.377	0.772	6.877
Ymir Yankee Girl Gold Mines Ltd.....	1.068	3.696	(11) 1.727	0.937	7.428

(a) Exclusive of outside exploration.

(b) Marketing, head office, taxes, etc.

(c) Depreciation not included.

(1) Includes a considerable cost of exploration and development.

(2) Fiscal year ending Sept. 30, 1937.

(3) Includes interest on loans and preliminary development written off.

(4) Not including taxes.

(5) Not given—data taken from company's annual printed report.

(6) Mining, exploration and development charged to operating costs.

(8) Includes development.

(9) Includes development, ore transportation and pumping.

(10) Commenced milling May 1937.

(11) Concentrates shipped to smelter.

(12) Fiscal year ending March 31, 1938.

Table 62 —Certain Data Relating to the Production of Gold by the Entire Auriferous Quartz Mining Industry in Canada, 1928-1937

Year	Ounces of gold produced per wage-earner year	Cost of fuel and electricity per ounce of gold produced	Cost of wages per ounces of gold produced	Cost of explosives and other process supplies used per ounce of gold produced	Cost of freight and treatment of ores shipped to smelters per ounce of gold produced (d)	Total of specified costs
	Ounces	\$	\$	\$	\$	\$
1928.....	206	1.47	7.45	Information not available	Information not available	.....
1929.....	218	1.46	7.18	.....	.....	.....
1930.....	237	1.25	6.63	.....	.....	.....
1931 (a).....	250	1.19	6.50	.....	.....	.....
1932.....	255	1.21	6.31	.....	.....	.....
1933 (b).....	207	1.36	7.45	.....	.....	.....
1934 (c).....	154	1.71	9.64	.....	.....	.....
1935.....	146	1.89	10.48	4.38	.....	16.75
1936.....	137	1.98	11.32	4.46	.....	17.76
1937.....	132	2.10	12.18	4.65	0.33	19.26

(a) Equalization exchange premiums paid by the Dominion Government to gold miners (Great Britain goes off gold standard).

(b) United States goes off gold standard.

(c) United States gold dollar reduced in weight from 25.8 to 15 5/21 grains, 0.9 fine.

(d) Not including Mint charges.

NOTE.—The data contained in the foregoing table have been compiled from reports received from both producing and non-producing (exploring and developing) operators in the auriferous quartz mining industry. This fact should be noted if the information is to be construed or employed as possible criteria for technological or other statistical study. The trends revealed are not to be interpreted as reflecting "cause and effect" in the operation of producing mines only but rather as indices of change in the industry as a whole.

Table 63 —Gold Content of Bullion, Ores, Concentrates, etc., Shipped and Ore Milled by Auriferous Quartz Mines in Canada, with Average Price of Gold in Canadian Funds, 1929-1937

Year	Tonnage treated (x)	Gold content fine oz. (*)	Oz. of fine gold per ton	Average price of gold
1929.....	4,371,143	1,771,526	.41	\$ 20.67
1930.....	4,429,906	1,884,791	.43	20.67
1931.....	5,526,379	2,271,278	.41	21.55
1932.....	5,997,492	2,502,327	.42	23.47
1933.....	6,480,164	2,455,365	.38	28.60
1934.....	7,524,803	2,490,513	.33	34.50
1935.....	8,907,610	2,645,659	.30	35.19
1936.....	10,510,750	3,095,427	.29	35.03
1937.....	11,919,965	3,490,170	.29	34.99

(x) Does not include tailings retreated.

(*) A relatively small quantity of gold contained in concentrates, slags, etc., shipped may have originated in ores treated during the previous year.

(a) Material discarded by sorting not included.

Table 64.—Capital Employed in the Auriferous Quartz Mining Industry in Canada, 1937

Province	Mines		Capital employed as represented by:					Total
			Present cash value of the land (excluding minerals)	Present value of buildings, machinery, tools, equipment, etc.	Inventory value of materials on hand, ore in process, fuels, etc.	Inventory value of finished products on hand	Operating capital (cash bills and accounts receivable, prepaid expenses, etc.)	
	Operating	Producing						
			\$	\$	\$	\$	\$	\$
Nova Scotia.....	20	15	556,057	717,448	62,004	8,298	40,433	1,384,240
Quebec.....	257	20	42,876,201	12,586,717	1,786,047	1,228,711	5,570,996	64,048,672
Ontario.....	222	68	57,468,027	69,161,667	6,133,751	2,501,977	32,258,485	167,523,907
Manitoba.....	15	8	4,458,196	3,546,470	522,531	105,572	1,043,225	9,675,994
Saskatchewan.....	9	1	342,518	538,127	9,700	.....	224,118	1,114,463
British Columbia.....	130	77	10,045,687	7,225,081	1,042,952	651,963	4,474,478	23,440,161
Northwest Territories.....	6	.....	1,377,635	268,268	156,442	.....	155,867	1,958,212
Total.....	659	189	117,124,321	94,043,778	9,713,427	4,496,521	43,767,602	269,145,649

Table 65 —Employees, Salaries and Wages in the Auriferous Quartz Mining Industry in Canada, by Provinces, 1937

Province	Number of employees					Salaries and wages
	On salary	Wage-earners			Total em- ployees	
		Surface	Under-ground	Mill		
Nova Scotia.....	48	130	265	42	485	\$ 516,987
Quebec.....	756	2,442	2,043	235	5,476	8,079,743
Ontario.....	1,334	5,147	10,697	1,137	18,315	31,854,330
Manitoba.....	102	311	367	62	842	1,399,884
Saskatchewan.....	48	146	67	5	266	310,305
British Columbia.....	390	902	1,959	380	3,631	5,848,778
Northwest Territories.....	22	86	17	.....	125	209,291
Canada.....	2,700	9,164	15,415	1,861	29,140	48,219,318

Table 66.—Wage-Earners, by Months, in the Auriferous Quartz Mining Industry, 1936-1937

Month	1936	1937
January.....	18,895	24,713
February.....	19,074	24,702
March.....	19,397	25,302
April.....	20,060	25,654
May.....	21,034	26,584
June.....	22,750	26,651
July.....	23,599	26,983
August.....	24,643	27,437
September.....	25,624	27,521
October.....	26,628	27,259
November.....	25,910	26,481
December.....	24,899	26,187

THE COPPER-GOLD-SILVER MINING INDUSTRY

The mining of "copper-gold-silver" ores in Canada during 1937 was confined to the provinces of Quebec, Manitoba, Saskatchewan and British Columbia. It is to be noted that in addition to the copper recovered from ores of this type there is a very large and increasing quantity of the metal obtained in the smelting and refining of the copper-nickel ores mined in the Sudbury area of Ontario; increasing quantities of gold and silver are also being extracted from these copper-nickel ores.

The number of firms reported as active in the Canadian "copper-gold-silver mining industry" during 1937 totalled 35 compared with 26 in 1936. The gross value of crude ore, concentrates, etc., shipped from the mines and mills to smelters was estimated at \$40,735,801; the cost of fuel, purchased electricity, process supplies, freight and smelter treatment charges, totalled \$15,832,950; based on these data the net value of shipments in 1937 was computed at \$24,902,851 against a corresponding net value of \$15,619,897 in 1936.

The number of employees engaged in the mining or development of copper-gold-silver and copper-gold-silver-zinc ores in 1937 totalled 5,164 and salaries and wages distributed by the industry amounted to \$8,240,614; the corresponding figures for the preceding year were 3,738 employees and \$5,473,325 for salaries and wages.

The foregoing statistics refer only to mines and mills and are not inclusive of data pertaining to smelters and refineries, particulars for which are compiled and recorded under the non-ferrous smelting and refining industry.

Quebec.—The following notes on the metal mines of Western Quebec have been abstracted from the periodical reports made by the Quebec Inspector of mines for the Rouyn-Harricana district—R. H. Taschereau.

"One of the main features of mining in Western Quebec in 1937 was the notable activity in the mines operating on complex ore, the outstanding one of which is the Horne mine of Noranda Mines Limited. This mine hoists and treats 6,000 tons of ore a day, of which about 60 per cent is first treated in the concentrator to be reduced approximately 6 to 1, and 40 per cent goes direct to the Noranda smelter. This complex ore produces gold, copper, silver, selenium and tellurium. The other complex ore mines which produced in 1937 were the Aldermac, copper, gold and iron pyrites; Waite and Amulet, zinc, copper and gold, and Normetal, copper, zinc, gold and silver. The resumption of active work of the latter mines was due to better prices of the base metals in the world's markets."

During 1937 the Noranda smelter treated 1,155,755 tons of ore, concentrate and refinery slag and produced 89,915,813 pounds of anodes. After deducting the copper, gold and silver which was recovered from the refinery slag, the estimated production of new copper, gold and silver was 87,060,237 pounds of fine copper, 280,806 ounces of gold and 705,494 ounces of silver. Included in these figures is the production from 51,338 tons of customs ore and concentrate. If the estimated production from this customs ore and concentrate is deducted, the estimated recovery from the Horne mine is 80,172,108 pounds of fine copper, 274,162 ounces of gold and 599,911 ounces of silver. The Noranda concentrator milled 1,106,609 tons of ore from the Horne mine, the average analysis of which was 2.02 per cent copper, 0.131 ounces gold per ton, and 0.35 ounce silver per ton. As on January 1, 1938, the following tonnage of ore was indicated above the 2,975 foot level of the Horne mine—sulphide ore over 4 per cent copper, 7,693,000 tons, 7.36 per cent copper, 0.165 ounce gold per ton; sulphide ore under 4 per cent copper, 19,699,000 tons, 0.95 per cent copper, 0.187 ounce gold per ton; silicious fluxing ore, 3,509,000 tons, 0.83 per cent copper, 0.123 ounce gold per ton.

Ontario.—In Ryan township a small amount of work was conducted on a copper property held under option by an American company. A few tons of ore (chalcocite) were bagged and shipped; this material had been mined during preceding years.

Manitoba and Saskatchewan.—The most important producer of copper-gold-silver ores in Central Canada is the Hudson Bay Mining and Smelting Company, Ltd.; the Flin Flon mine and smelter of this company are located on the inter-provincial boundary between Saskatchewan and Manitoba and production, according to origin of ore, is credited to both provinces.

During 1937 the Hudson Bay Mining and Smelting Company, Ltd., mined, from both open pit and underground, a total of 1,647,438 tons of ore of which 1,643,452 tons averaging, per ton, copper 2.17 per cent, zinc 4.7 per cent, gold 0.107 ounce, silver 1.52 ounces, were milled; about 81 per cent of the total plant ore requirements came from underground and about 19 per cent from open pit mining operations. There was smelted during the year a total of 320,918 tons of Flin Flon ore and concentrates and 21,642 tons of customs ore and concentrates. There were shipped 34,240 tons of blister copper of which the following metal contents were credited to the Hudson Bay Mining and Smelting Company, Ltd.—gold 133,605 ounces; silver 1,648,838 ounces; copper 57,988,245 pounds; selenium 89,733 pounds, and tellurium 12,850 pounds.

There was treated in the Flin Flon zinc plant during 1937 a total of 94,936 tons of zinc concentrates from which was produced for sale a total of 68,972,224 pounds of slab zinc. There was also produced the usual zinc plant residue which was sent to stockpiles. During the year there was produced a total of 308,776 pounds of metallic cadmium which assayed 99.9911 per cent cadmium. The cyanide plant was operated at its maximum capacity; there was treated in this plant a total of 1,054,176 tons of tailings which had an assay value of gold 0.039 ounce per ton and silver 0.53 ounce per ton. Recoveries from this plant are included in the blister copper produced in the smelter. The ore reserves of the Flin Flon mine are reported by the company to have been fully maintained both as to tonnage and grade.

With improvement in the copper market, the Sherritt Gordon mine, near Cold Lake, Manitoba, prepared to resume operations after a close-down since June, 1932. Production was resumed at August 1, 1937.

With increased power consumption at Flin Flon, the Sherritt Gordon mine had to await the addition of another unit to the generating plant at Island Falls where previously power had been supplied by the Churchill River Power Company, Limited.

After resumption of operations, the Sherritt Gordon mine worked up to a capacity of 1,500 tons a day, the ore being mined from what is known as the "West Zone". The total tonnage milled during the year was 195,694.

Ore was concentrated at Sherridon, and the concentrate, 21,738 tons, shipped to Flin Flon smelter to be turned into blister copper. After treatment at an eastern refinery, the following production was made—9,951,718 pounds copper, 2,534 ounces gold, 80,672 ounces silver. Total ore reserves are estimated at 3,755,000 tons averaging 2.68 per cent copper, 3.12 per cent zinc, and \$0.64 per ton in gold and silver; low grade tonnage is estimated at 910,000 tons containing 1.20 per cent copper and \$0.60 per ton in gold and silver.

British Columbia.—The outstanding event was the bringing into production again of the Copper Mountain mine near Allenby in the Similkameen Mining Division, by the Granby Consolidated Mining, Smelting and Power Company. This mine was closed down in 1930, but in June, 1937, the mill of 3,000 tons capacity was again in operation. During the year 444,552 tons were milled and concentrates produced totalled 17,265. The shipping of concentrates continues and work at the mine goes ahead. In addition to the mine and mill, a power plant was installed, and a small coal mine purchased to ensure an adequate supply of fuel for same.

The old Granby mine near Phoenix is now being operated by W. E. McArthur of Greenwood, and shipments are being made with regularity.

The Britannia Mining and Smelting Company operated at capacity during 1937, and shipments of copper concentrates and precipitates totalled 66,468 tons. In addition pyrite (sulphur ore) concentrates were shipped. Development work was actively proceeded with.

The Consolidated Mining and Smelting Company reports a production of 2,292 tons of copper in 1937. It is also reported that twenty leases were in effect on the old Rossland properties, and a total of 8,216 tons were shipped from same. The company also reports that the Anyox property, purchased from the Granby Company, was examined with a view to determining if a salvage operation could be profitably undertaken. Diamond drilling was started late in July, and some 9,564 feet completed by December 31. Preparations are now under way for more exploration of the ore-body indicated, and the possibility of a future operation is in view.—(Dr. J. F. Walker, Deputy Minister of Mines, British Columbia.)

Table 67.—Capital Employed in the Copper-Gold-Silver Mining Industry in Canada, 1937

CAPITAL EMPLOYED, as represented by:	
(a) Present cash value of the land (excluding minerals).....	\$ 16,109,671
(b) Present value of buildings, fixtures, machinery, tools and other equipment.....	\$ 34,406,344
(c) Inventory value of materials on hand, ore in process, fuel and miscellaneous supplies on hand.....	\$ 2,805,865
(d) Inventory value of finished products on hand.....	\$ 1,022,212
(e) Operating capital (cash, bills and accounts receivable, prepaid expenses, etc.).....	\$ 18,994,166
Total.....	\$ 73,338,258
Number of firms.....	35
Number of operating mines.....	38
Number of producing mines.....	20

Table 68.—Employees, Salaries and Wages in the Copper-Gold-Silver Mining Industry in Canada, 1937

	Number	Salaries and wages
SALARIED EMPLOYEES—		\$
Total.....	462	1,094,864
WAGE-EARNERS—		
Surface.....	1,517	
Underground.....	2,417	
Mill.....	768	7,145,750
Total.....	4,702	
Grand Total.....	5,164	8,240,614

Table 69.—Wage-Earners, by Months in the Copper-Gold-Silver Mining Industry, 1936 and 1937

Month	1936	1937
January.....	3,136	3,846
February.....	3,083	3,928
March.....	3,143	4,128
April.....	3,220	4,265
May.....	3,313	4,639
June.....	3,446	4,936
July.....	3,523	5,135
August.....	3,566	5,123
September.....	3,582	5,034
October.....	3,587	5,121
November.....	3,685	4,990
December.....	3,668	5,019

Table 70.—Shipments from Copper-Gold-Silver Mines of Canada, 1937

	Quantity	Value	Total metal content as determined by settlement assay				
			Gold	Silver	Copper	Sulphur	Zinc
	Tons	\$	fine oz.	fine oz.	pounds	tons	pounds
14 mines shipped to Canadian plants—(b)							
Ores.....	943,790	7,829,208	165,052	388,414	47,632,125		
†Copper concentrates.....	528,792	22,325,631	267,998	2,220,794	119,867,914		(c)
Zinc concentrates.....	106,074	3,516,450	8,135	184,248	1,593,711		95,941,609
Iron pyrites concentrates.....	1,037	4,170				523	
7 mines shipped to foreign plants:							
Ores.....	131	2,476	43	164	13,222		
Copper concentrates.....	97,553	6,460,244	15,120	266,874	48,759,159		
Zinc concentrates.....	5,871	237,973					6,041,690
Iron pyrites concentrates.....	118,420	359,649				59,657	
Total (f).....	1,801,668	40,735,801	456,348	3,060,494	217,866,131	60,180	101,983,299
Value of process supplies, etc.(e).....		15,832,950					
Net Value.....		24,902,851					

† Includes some cyanide precipitate and slags.

(b) Includes 7 mines operated in the Rossland area by leasers in both 1936 and 1937.

(c) Not recovered; quantity not reported in 1937.

(e) Includes freight on ore shipments, smelter charges and fuel and purchased electricity.

(f) Gross value.

Table 71.—Ore Mined and Milled in the Copper-Gold-Silver Mining Industry, in Canada, 1937

	Quebec, Manitoba, and Sask- atchewan	British Columbia	Canada
	tons	tons	tons
Ore mined.....	4,173,033	2,576,776	6,749,809
Ore milled.....	3,241,404	2,560,627	5,802,031
Copper concentrates produced.....	547,722	82,942	630,664
Copper precipitates produced.....		791	791
Pyrite concentrates produced.....	115,779	85,715	201,494
Zinc concentrates produced.....	116,698		116,698

NOTE.—In addition some cyanide precipitate is produced in the recovery of gold from copper-gold ores; this is smelted in the production of blister or anode copper.

CHAPTER III

THE SILVER MINING INDUSTRY IN CANADA

(a) The Silver-Cobalt Mining Industry; (b) The Silver-Lead-Zinc Mining Industry.

Definition of the Industry.—Silver mining in Canada is not a distinct mining industry in as much as silver or silver-bearing minerals usually occur in association with other metals of economic value—with lead and zinc; with cobalt, nickel and arsenic; with lode and placer free gold; in copper-gold and nickel-copper ores, and at Great Bear Lake, N.W.T., with uranium and radium. Silver-lead-zinc mining is a very important industry in British Columbia and, to a lesser extent, in the Yukon Territory. In Eastern Canada ores containing lead and zinc have been mined in Ontario, Quebec and Nova Scotia.

It is to be noted that, in addition to its recovery from silver-lead-ores, zinc is now produced in large quantities from the copper-gold-silver ores of the Flin Flon mine, a property located on the Manitoba-Saskatchewan boundary. Zinc concentrates are also produced in British Columbia from copper-gold-silver ores by the Britannia Mining and Smelting Co. Ltd.; the metal also occurs with copper-gold-silver ores in Quebec and commercial shipments of zinc concentrates made from these particular ores were reported in 1937.

Statistical data contained in this report are essentially those pertaining to the mining of silver-cobalt and silver-lead-zinc ores and, to a lesser extent, silver-pitchblende ores.

(a) The Silver-Cobalt Mining Industry

The mining of silver-cobalt ores in Canada is confined to the district of Temiskaming in Northern Ontario. Veins containing these metals were discovered at or near the present town of Cobalt in 1903 and shipments of ores from this area have been continuous since 1904. Depletion and exhaustion of ore reserves during recent years have resulted in a relatively great decline in the production of metals from these deposits. During the past few years the greater part of the output of silver-cobalt ores in Northern Ontario has originated in the Miller-Lake O'Brien mine, Gowganda, and the O'Brien mine, Cobalt. In most instances, operations at other properties, some of which were prominent as producers in the past, were conducted by lessees and shipments ranged from one to several hundred tons. The increased demand for cobalt as an alloying metal has, for some years, stimulated operations of a salvage nature at several of the older mines.

In 1937 the net value of shipments totalled \$540,762 compared with \$915,376 in 1936. During the year under review operators numbered 23, employees totalled 300, and salaries and wages paid amounted to \$394,386. The decrease in the mining of silver-cobalt ores within the last decade is reflected in a comparison of the employment statistics for 1937 with those of 1928 in which year employees totalled 1,166 and salaries and wages aggregated \$1,809,466.

Table 72 —Statistics of the Silver-Cobalt Mines and Mill Operations in Canada, 1935, 1936 and 1937

	1935	1936	1937
Number of mines in operation (x).....	28	25	25
Ore mined..... tons	57,287	59,592	56,878
Ore treated (milled) (a)..... tons	42,934	62,087	61,290
Tailings treated..... tons		421	
Concentrates produced..... tons	952	1,556	1,435
Bullion sold or shipped (exported)..... fine oz.	1,158,986		
Gross value of bullion, ore, concentrates and residues sold.....	(c) 2,316,934	(c) 1,096,968	853,386
Cost of freight..... \$	(b)	(b)	29,202
Smelter charges..... \$	(b)	(b)	76,833
Cost of fuel and purchased electricity used..... \$	114,439	104,372	90,134
Cost of process supplies used..... \$	131,779	77,220	116,455
Net value of sales..... \$	2,070,716	915,376	540,762

(x) All mines located in Northern Ontario.

(a) Does not include crude ore shipped.

(b) Information not available.

(c) Less freight and treatment.

Table 73 —Capital Employed in the Silver-Cobalt Mining Industry in Canada, 1937

	\$
Capital employed as represented by:—	
(a) Present cash value of the land (excluding minerals).....	2,501
(b) Present value of buildings, fixtures, machinery, tools and other equipment.....	199,581
(c) Inventory value of materials on hand, ore in process, fuel and miscellaneous supplies on hand.....	100,264
(d) Inventory value of finished products on hand.....	33,000
(e) Operating capital (cash, bills and accounts receivable, prepaid expenses, etc.).....	2,319,714
Total	2,655,060

Table 74 —Employees, Salaries and Wages in the Silver-Cobalt Mining Industry in Canada, 1937

	1937	
	Number	Salaries and wages
		\$
SALARIED EMPLOYEES—		
Total	33	67,138
WAGE-EARNERS—		
Surface.....	83	327,248
Underground.....	142	
Mill.....	42	
Total	267	
Grand Total	300	394,386

Table 75 —Number of Wage-Earners on Payroll or Time Record on the 15th of Each Month, or Nearest Representative Date, in the Silver-Cobalt Mining Industry, 1937

Month	1937		
	Mine		Mill
	Surface	Underground	
January.....	74	153	32
February.....	69	154	33
March.....	66	151	33
April.....	70	151	36
May.....	84	150	37
June.....	96	119	49
July.....	90	120	50
August.....	95	127	52
September.....	95	134	52
October.....	92	138	53
November.....	92	143	37
December.....	77	142	33

(b) The Silver-Lead-Zinc Mining Industry

In 1937, silver-lead-zinc ores were mined and shipped in the provinces of Nova Scotia, Quebec, Ontario and British Columbia, also in the Yukon Territory. During the year the tonnage of mine shipments totalled 594,137 short tons of crude ore and concentrates compared with 482,665 tons in 1936; of the shipments in 1937 the tonnage consigned to Canadian plants totalled 523,851 and that to foreign smelters, 70,286.

Silver-pitchblende ores are now being shipped from the Great Bear Lake area of the Northwest Territories, general statistics pertaining to which are included with those for the silver-lead-zinc mining industry.

Especially reflecting the increased demand for non-ferrous metals during the year under review was the increase over 1936 of 45.4 per cent in the number of Canadian operators engaged in the mining or development of silver-lead-zinc ores. The number of such operators reported as active in 1937 totalled 128; the net value of ores, concentrates, etc., shipped amounted to \$22,740,582 compared with \$13,814,645 in 1936; employees in 1937 totalled 2,220 against 1,870 in the preceding year and salaries and wages paid amounted to \$3,914,643 compared with \$2,917,832 in 1936. Of the combined number of operators constituting the Canadian silver-lead-zinc mining industry in 1937, there were 114 located in British Columbia and of the total net value of production, British Columbia alone accounted for \$21,507,457, or 94.5 per cent.

Nova Scotia.—The British Metal Corporation (Canada) Ltd. operated the Stirling mine in Richmond County continuously throughout 1937. The tonnage milled during the year totalled 88,449; mill production consisted of 9,333.15 tons of zinc concentrates and 3,686.05 tons of mixed copper-lead concentrates. All concentrates produced are shipped to Halifax from the coastal port of Fouchu, situated 11½ miles from the property. Unfortunately, during the year only 4,563 tons were shipped, due to Atlantic storms having partially silted up the harbour. This condition was being alleviated and it was reported that the company intended to ship the accumulated tonnage in 1938. The Stirling ore is a finely disseminated complex of zinc, lead, and copper sulphides, containing small values in gold and silver and occurring in talcose altered and sheared andesitic rocks. Both mining and milling operations were suspended in February, 1938.

Quebec.—Mining and milling operations in 1937 were continuous at the Tetreault mine, Montauban les Mines, from January 2 to May 31. Ore milled totalled 46,337 tons and 824 tons of lead concentrates and 3,272 tons of zinc concentrates were produced; these were exported for smelting in European plants. Labour trouble developed at this property in June and all work has since been suspended.

On Calumet Island in the Ottawa River the Calumet Mines Ltd. conducted diamond drilling operations and assessment work and prospecting were carried on in Frontenac county by the Mega Mining Syndicate.

Ontario.—In Hess township, Sudbury district, the property of the Lake Geneva Mining Co. Ltd. was active from March to the end of the year. Ore mined totalled 1,360 tons and the mill treated a tonnage of 1,287. Both lead and zinc concentrates were produced, the latter being exported for treatment in foreign plants. Early in 1938 the property of this company was reported as closed down.

In Cashel township, Hastings county, the Gunter Galena Mines Ltd. carried on surface work on its property from June to August.

On Chats Island, near Galetta, surface work was conducted during October, November and December, 1937, at the old Kingdon mine by the Fort Rouille Mining Corporation, Ltd. No milling or mining operations were recorded and the property was reported again idle early in 1938.

In Lennox and Addington counties work was conducted from May at the Lennox mine in Sheffield township. This consisted of both surface and underground development and included diamond drilling; no milling was reported by the operators, the Lennox Mines Co. Ltd., but some 500 tons of ore were reported as having been mined during the first six months of 1938.

It was also reported in the press that in 1937 the Katherine Lead Mines Ltd. had renovated its surface plant and was preparing to commence underground operations at its property located in Lake township, Hastings county.

British Columbia.—The most gratifying feature in the mining of silver-lead-zinc ores during 1937 was the abnormally high prices for lead and zinc which, even allowing for volume records, resulted in phenomenal value records in production of these metals in British Columbia. In the case of lead, the gross value of \$20,623,445 was the greatest for any one metal or material in any year in the history of mining in the province. Zinc production in 1937 at 287,192,877 pounds and \$14,078,195 was also an all time high record in the mining of silver-lead-zinc ores in British Columbia.

The Sullivan mine, located at Kimberley and operated by the Consolidated Mining and Smelting Company of Canada, Ltd., is the largest producer of silver-lead-zinc ores in Canada. This deposit is one of the greatest of its kind in the world and its successful development has proven of very great benefit in the economic development of the province.

Total production at the Sullivan mine in 1937 amounted to 2,218,251 tons of silver-lead-zinc ore shipped to the concentrator at Kimberley and 113 tons of crude lead ore to the smelter at Tadanac, an increase of 320,625 tons over the production for 1936. During the year the mine was operated 300 days, the coarse crushing plant, 306 days, and the concentrator, 341 days. The concentrator treated 2,219,576 tons, an average of 6,509 tons per day, and produced 285,597 tons of lead concentrates and 238,413 tons of zinc concentrates, containing 8,296,366 ounces of silver, 413,787,735 pounds of lead, and 263,956,398 pounds of zinc.

Salvage operations and preparation for stopes for filling were continued and produced 801,612 tons, or approximately 36 per cent of the total ore treated during the year. Fully developed ore reserves were maintained. The ratio of lead to zinc in the indicated ore, however, on account of increased zinc and lower lead values below the 3,900 level was reduced from 1.6265:1 of last year to 1.38:1.

In the Eastern Mineral Survey District (No. 5), in addition to increased production at the Sullivan mine, there were also considerable increases in production from the Slocan-Ainsworth area and some production from the Lardeau mining division. In these areas a number of properties were re-opened and development work was carried out in addition to the production activity. Several of the properties shut down on the approach of winter, influenced in part by the decline in base metal prices. Crude ore was shipped in some volume from the Slocan-Ainsworth area and a little was shipped from the Lardeau mining division. Some ore was milled at the customs mill constructed by Messrs. Ayerton and Cohen; this mill is located a few miles west of Nelson.

In April, mine operations were resumed by Base Metals Mining Corporation, Ltd., at the Monarch mine located at Field. The company reported that exploratory work resulted in the finding of a new orebody. Underground development and diamond drilling were being carried on to outline this ore as rapidly as possible; operations at the Kicking Horse mine were confined to preparing the known orebodies for mining and installation of facilities for transporting the ore to the mill. The mill of the company was not operated during the year and no shipments of ore were reported.

Activity on properties located in the Greenwood and Beaverdell areas was quite pronounced during 1937. Some of the more important of these operations included those conducted at the following mines—Providence, Highland Bell, Sally, Beaverdell-Wellington, Beaver and Last Chance.

Yukon Territory.—Production from the mines on Galena Hill continued steadily throughout 1937 and a large tonnage of ore was treated in the mill of the Treadwell Yukon Co., Ltd., at the Elsa mine. The Department of Mines and Resources, Ottawa, reported that the resumption of large scale shipping of silver-lead concentrates and ore from Mayo was the most important mining event of the year in the Yukon.

At the Silver King mine of the Treadwell Yukon Company, Ltd., the shaft has been carried down to the 300 foot level and drifting at this level was commenced. At the Elsa mine ore was being drawn from a raise between the 200 and 400 foot levels. On the Hector group an adit was being driven south to intersect the vein 300 feet below the shaft collar.

On the Arctic group of Messrs. Settlemier and Bermingham, exploration and mining were in progress and the vein on this property has been followed for a length of over 1,050 feet. It is reported that a considerable tonnage of milling ore and approximately 750 tons of high grade ore, suitable for direct shipping, have been proved on this property.

Mr. J. Sugiyama conducted mining operations on the east face of Galena Hill and a small shipment of ore was made to the Trail smelter. On the northeast slope of Galena Hill Messrs. D. Morrison, T. McKay and Colley have traced a vein believed to be the continuation of that developed on the Hector group.

Northwest Territories.—The following information relating to operations conducted in 1937 by Eldorado Gold Mines, Limited, at its mine located at Port Radium, Great Bear Lake, is from the annual report of that company—

"During 1937 the scope of underground operations from No. 1 shaft was enlarged to include investigation of Nos. 1 and 3 veins. A prospect shaft 3,800 feet northeast of No. 1 shaft was slashed and continued to a depth of 145 feet. Exploration is in progress on the 125 foot horizon. Two short high-grade oreshoots have been opened up in this area. It is presumed Nos. 1, 2 and 3 veins merge at a point near the shaft location.

"During the year 25,486 tons of ore were hoisted from which was sorted 1,616.4 tons of waste and 42.6 tons of high-grade silver, pitchblende and cobalt ores. Concentrates produced, including cobbled, totalled 674.5 tons comprising 475.3 tons of pitchblende-silver; silver-copper (flotation) 193.3 tons; cobalt (cobbled) 5.9 tons.

"Ore shipments during 1937 consisted of 396.3 tons of pitchblende-silver concentrates and 169.8 tons of silver-copper concentrates. Incoming water freight totalled 1,162 tons and incoming air freight, 90,022 pounds, all being delivered by the company's own transportation facilities.

"The most important additions to facilities and equipment at the mine were those that increased the silver and pitchblende recovery from approximately 60 per cent to 75 per cent at the end of the year and those which increased the effective power to 834 horse power at the central workings. The value of ore reserves has been increased \$2,084,080.40 over the figure contained in the last annual report.

"A prospect shaft was started on the Bonanza property and had reached a depth of 25 feet on December 31."

According to a statement published by Financial Counsel, Montreal, the Bear Exploration and Radium Ltd., in 1937 milled 1,299 tons of ore for a production of 70,546 ounces of silver. The property of this company is located at Contact Lake, Great Bear Lake area, and was reported as still in production in 1938. Operations at this property are now being supervised by the management of the Eldorado Gold Mines Ltd.

"The Echo Bay silver property of the Consolidated Mining and Smelting Company of Canada, Ltd., was inactive during 1937."

Table 76 —Ore Mined and Milled in the Silver-Lead-Zinc Mining Industry* in Canada, 1936 and 1937

	Yukon and Northwest Territories	British Columbia, Quebec and Nova Scotia	Canada
	tons	tons	tons
1936			
Ore mined.....	51,963	2,144,519	2,196,482
Ore milled.....	50,384	2,124,231	2,174,615
Concentrates produced—Lead.....	4,239	261,185	265,424
Zinc.....		235,544	235,544
Pitchblende-silver.....	393		393
Silver.....	88		88
1937		(a)	
Ore mined.....	83,125	2,441,423	2,524,548
Ore milled.....	81,375	2,433,628	2,515,003
Concentrates produced—Lead.....	6,190	293,685	299,875
Zinc.....		258,948	258,948
Pitchblende-silver.....	675		675
Silver.....	(b)		(b)

(x) Includes silver-pitchblende ores mined in Northwest Territories.

(a) Includes data relating to one property in Ontario in 1937.

(b) In transit and included with data for 1938.

Table 77 —Destination of Shipments from Silver-Lead-Zinc Mines of Canada, 1936 and 1937

	Tons shipped	Value at shipping point	Total metal content as determined by settlement assay:			
			Gold fine oz.	Silver fine oz.	Lead pounds	Zinc pounds
1936		\$				
To Canadian smelters—						
Lead ore.....	5,012	306,755	190	721,627	1,119,311	505,136
Lead concentrates (a).....	252,091	11,738,751	81	6,640,674	352,915,726	19,535,816
Zinc concentrates (x).....	181,088	2,540,665		375,881	11,571,340	185,514,106
Dry ore.....	1,976	54,330	837	92,744	25,395	18,675
Silver concentrates (b).....	2	5,833		13,143		
Total.....	440,169	14,646,334	1,108	7,844,069	365,631,772	205,573,733
To Foreign smelters—						
Lead ore.....	2,703	194,696	75	441,981	2,840,088	94,423
Lead concentrates.....	7,887	504,119	3,946	766,185	5,938,438	29,958
Silver concentrates (b).....	41	28,147		62,548		
Zinc concentrates (x).....	31,826	333,261	504	122,363	958,344	32,443,675
Dry ore.....	39	2,583	83	765		
Total.....	42,496	1,062,806	4,608	1,393,842	9,736,870	32,568,056
Grand Total (gross) 1936.....		(c)15,709,140				
Cost of fuel purchased and electricity.....		680,677				
Cost of process supplies.....		1,213,818				
Net Value—1936.....		13,814,645				
1937						
To Canadian smelters—						
Lead ore.....	7,124	434,668	356	858,013	1,381,069	289,739
Lead concentrates (a).....	287,963	18,184,247	571	8,261,829	398,167,648	22,123,807
Zinc concentrates (x).....	226,882	6,570,716	37	529,583	15,818,184	229,395,304
Dry ore.....	1,882	45,011	672	66,898	93,845	31,440
Silver concentrates (b).....						
Total.....	523,851	25,234,642	1,636	9,716,323	415,460,746	251,840,299
To Foreign smelters—						
Lead ore.....	5,456	262,116	80	506,825	2,644,976	34,470
Lead concentrates.....	9,919	1,767,727	2,460	3,806,914	8,166,593	
Silver concentrates (b).....						
Zinc concentrates (x).....	54,680	1,250,208	253	139,827	2,548,185	56,666,208
Dry ore.....	231	14,274	75	21,834	29,484	52,860
Total.....	70,286	3,294,325	2,868	4,475,400	13,389,238	56,753,538
Grand Total (Gross)—1937.....		28,528,967				
Cost of freight.....		1,860,860				
Cost of fuel and purchased electricity.....		845,895				
Smelter charges.....		1,141,450				
Cost of process supplies.....		1,940,177				
Net value—1937.....		22,740,582				

(x) Does not include any zinc concentrates produced from copper-gold-zinc ores in Quebec, Manitoba, Saskatchewan or British Columbia.

(a) Includes shipments of silver-pitchblende concentrates from Northwest Territories. Information relating to radium content of pitchblende is not available for publication.

(b) Recovered from pitchblende-silver ores; 1937 shipments in transit will be credited to 1938.

(c) Less freight and treatment charges.

NOTE.—In addition to the metals contained in shipments listed in Table 18, there are important quantities of lead and silver contained in ores shipped from certain gold mines in British Columbia, also copper amounting to 822,569 pounds was contained in lead ores and concentrates shipped to foreign smelters in 1936, and 188,969 pounds in 1937. Cadmium, bismuth and sulphur are also recovered from these ores.

Table 78 —Capital Employed in the Silver-Lead-Zinc Mining Industry in Canada, 1937

Province	Present cash value of land excluding minerals	Present value of buildings, fixtures, machinery, tools and other equipment	Inventory value of materials on hand, ore in process, fuel and miscellaneous supplies on hand	Inventory value of finished products on hand	Operating capital (cash, bills and accounts receivable, prepaid expenses, etc.)	Total
1936	\$	\$	\$	\$	\$	\$
Nova Scotia, Quebec, Yukon and N.W.T.*	177,884	1,601,904	1,544,321	683,413	717,269	4,724,791
British Columbia.....	14,758,564	8,571,611	1,289,207	35,038	258,528	24,912,948
Canada.....	14,936,448	10,173,515	2,833,528	718,451	975,797	29,637,739

* Includes data relating to silver and silver-pitchblende ores mined in the Northwest Territories.

Table 79 —Employees, Salaries and Wages in the Silver-Lead-Zinc Mining Industry in Canada, 1937

Province	On salary	Mine		Mill	Total	Salaries and wages
		Surface	Under-ground			
British Columbia.....	222	357	750	324	1,653	\$ 2,919,685
Nova Scotia, Quebec, Yukon, and N.W.T.†.....	71	172	263	61	567	994,958
Canada.....	293	529	1,013	385	2,220	3,914,643

† Includes data on silver-pitchblende mining operations in the Northwest Territories.

Table 80 —Number of Wage-Earners, by Months, in the Silver-Lead-Zinc Mining Industry, 1937

Month	1937		
	Mine		Mill
	Surface	Underground	
January.....	421	890	368
February.....	360	960	371
March.....	413	1,012	389
April.....	442	1,084	408
May.....	527	1,078	394
June.....	611	1,013	369
July.....	631	1,007	391
August.....	622	1,037	381
September.....	591	1,031	397
October.....	589	1,040	402
November.....	551	1,011	391
December.....	477	947	376
Average.....	529	1,013	385

ARSENIC

Commercial production of new arsenic or arsenious oxide in Canada comes, at present, entirely from the treatment of cobalt-silver ores at the smelter of the Deloro Smelting and Refining Company Ltd. In 1886 the Deloro mine in the County of Hastings, Ontario, was believed to have been the only mine in Canada producing arsenic; in that year 120 tons of refined arsenious oxide was obtained as a by-product in the roasting of the auriferous quartz-mispickite ore of that mine.

Shipments of auriferous concentrates containing arsenopyrite have been made from gold mines in Nova Scotia and for several years arsenopyrite-gold concentrates were produced, for export, at the Hedley gold mine in British Columbia. Arsenic is also contained in gold ores mined at several properties in northwestern Quebec.

The greater part of the arsenic recovered throughout the world is obtained as a by-product in general smelting operations. The principal arsenic producing countries are the United States, Mexico, Sweden, Belgium and Australia.

Arsenic is consumed chiefly in the manufacture of insecticides, weed killers, glass, wood preservatives and certain medicines. The United States Bureau of Mines reports that the use of metallic arsenic appears on the increase; imports into the United States in 1937 totalled 150,659 pounds, an increase of 84 per cent over 1936. The chief uses of the metal are as a flux and as a metal-tempering material and hardener. The United States Department of Agriculture estimated that 1,257,000 gallons of liquid sodium arsenite (containing approximately 2,520 short tons of white arsenic) and 358 tons of dry sodium arsenite would be used in 1938 to combat the grasshopper and Mormon cricket menace in the Western Great Plains States.

Quotations for white arsenic in the United States were reduced from 3.5 cents per pound in 1936 to 3 cents in 1937, the lowest price since 1914. Quotations for calcium and lead arsenates, however, advanced in 1937 from the abnormal low prices prevailing in 1936.

Imports of white arsenic into Canada during 1937 totalled 7,604 pounds valued at \$462 while those of lead arsenate during the same year amounted to 237,992 pounds worth \$19,565. White arsenic was quoted in Canadian Trade Journals at 3½ to 4 cents per pound, June, 1938; black metallic (New York) at 42 cents.

Table 81 —Production in Canada, Imports and Exports of Arsenic, 1936 and 1937

	1936		1937	
	Quantity	Value	Quantity	Value
	Pounds	\$	Pounds	\$
PRODUCTION (x)—				
White arsenic and arsenic in other forms.....	1,365,606	42,491	1,389,426	41,032
Total.....	1,365,606	42,491	1,389,426	41,032
IMPORTS—				
White arsenic (arsenious oxide).....	529	90	7,604	462
Sulphide of arsenic.....	17,949	2,307	24,647	3,377
Soda, arseniate of, biarseniate and stannate of.....	6,520	1,863	18,510	5,908
Arsenate of lead.....	223,300	20,096	237,992	19,565
Arsenate of lime.....	276,552	16,372	71,168	4,305
Total.....		40,725		33,617
Exports—Arsenic—Total.....	638,400	25,004	735,000	26,938

(x) Entirely from Ontario.

Table 82 —Consumption of Arsenious Oxide and Arsenic Acid in the Manufacture of Canadian Insecticides, 1932-1937

Year	Pounds	\$	Year	Pounds	\$
1932.....	1,721,044	69,250	1935.....	2,736,089	86,983
1933.....	3,116,401	110,011	1936.....	3,368,956	106,132
1934.....	4,709,443	168,185	1937.....	3,296,559	102,651

Table 83 —Production of Arsenic in Canada, 1928-1937

Year	Arsenic in ore		White arsenic		Year	Arsenic in ore		White arsenic	
	tons	\$	tons	\$		tons	\$	tons	\$
1928.....	708	16,539	2,008	176,513	1933.....			734	56,534
1929.....	766	17,314	1,849	154,006	1934.....			824	56,412
1930.....	1,011	34,523	1,250	95,004	1935.....			1,279	75,326
1931.....			1,787	135,170	1936.....			683	42,491
1932.....			1,212	98,714	1937.....			695	41,032

Table 84 —World Production of Arsenic, 1935-1937

(Long tons)

(Supplied by Imperial Institute)

Producing country and description	1935	1936	1937
BRITISH EMPIRE			
United Kingdom—			
White arsenic and arsenic soot.....	172	153	95
Canada (sales)—			
White arsenic.....	1,142	610	620
Australia—			
White arsenic.....	4,098	3,691	3,368
FOREIGN COUNTRIES			
Belgium (exports)—			
White arsenic.....	3,049	2,688	2,991
Czechoslovakia—			
Ore (As. content).....	68	53	73
France—			
Ore (As. content).....	3,538	9,490	3,909
White arsenic (As. content).....	5,794	7,104	(a)
Germany—			
Ore (As. content).....	1,294	1,843	(a)
Greece—			
White arsenic.....	164	84	230
Pyrites (As. content).....	300	770	(a)
Portugal—			
Pyrites (As. content).....		74	
White arsenic.....	74	148	21
Roumania—			
Pyrites (As. content).....	29	30	32
Sweden—			
Ore (As. content).....	24,032	22,944	20,623
White arsenic.....	6,250	8,510	(a)
Mexico—			
White arsenic.....	9,793	8,392	10,592
United States—			
White arsenic.....	12,712	13,731	15,013
Brazil—			
White arsenic.....	681	720	705
China—			
Ore (b).....	1,200	(a)	(a)
Japan—			
White arsenic.....	3,111	2,587	(a)
Korea—			
White arsenic.....	367	226	(a)
Turkey—			
Ore (As. content).....	27	16	27

White arsenic is also produced in Germany and U.S.S.R.

(a) Information not available.

(b) Content varies from 20 to 60 per cent arsenic.

COBALT

The production of cobalt in Canada during 1937 totalled 507,064 pounds valued at \$848,145. The output of cobalt in the Dominion includes cobalt recovered in the metallic state, the cobalt content of oxides and salts made, and the metal content of cobaltiferous ores exported. The quantity produced in 1937 was 42.9 per cent less than in 1936 but the value of output realized a 5.4 per cent increase over that for the preceding year.

There is at present only one smelter in Canada treating cobalt ores; this is the plant of the Deloro Smelting and Refining Company, Limited, located at Deloro, Ontario. This company produced mixed nickel and cobalt oxides for the first time in 1910. Continuous operations were conducted by the company throughout 1937 and production included cobalt metal, cobalt salts, cobalt oxide, arsenic and silver bullion. Ores and concentrates treated at the Deloro smelter come entirely from the silver-cobalt mines of Northern Ontario.

The Belgian Congo and Northern Rhodesia are now the world's principal cobalt producers. Northern Rhodesia is the largest producer of the metal in the British Empire. Cobalt occurs here as the sulphide linnaeite (Co_3S_4), in the N'Kana copper ore deposit in amounts up to 0.5 per cent cobalt and, according to the Imperial Institute, London, the metal is recovered as ferro-cobalt during the copper smelting; it is exported mainly to the United States and Belgium. Production in 1937 was reported at 1,949,837 pounds valued at £665,553 compared with 1,016,683 pounds at £228,809 in 1936.

Statistics relating to production of cobalt in the Belgian Congo are not available for 1937. The Union Minière du Haut-Katanga reports in 1937 that recent discoveries of ore rich in cobalt have considerably increased its capacity to produce cobalt; a fourth electric furnace has been installed at the Jadotville-Panda cobalt smelter and markets for cobalt continue to develop. Cobalt bearing slag obtained in copper smelting is treated at the Jadotville-Panda plant for the production of a copper-cobalt-iron alloy which is shipped to a refinery at Oolen near Antwerp, Belgium, where the metals are separated.

"Output of cobalt in Germany will be increased by the resumed operation of an old mine at Schneeberg, Saxony, formerly the most copious cobalt producer in the world, as well as by exploitation of cobalt deposits in Wittichen and in the Southern Black Forest. In recent years Germany's production of cobalt, amounting to only around 17 metric tons annually, was obtained as a by-product of the Mansfeld copper shale deposits in Central Germany, but with the now developing exploitation of other essentially cobalt deposits, output will suffice to supply the great bulk of Germany's requirements of around 100 metric tons per year."—(Foreign Metals and Minerals, United States Department of Commerce.)

"About 155 miles west of Agadir in the Atlas Mountains is the Bou Azzer cobalt mine. Here the mineral zone is quite extensive and the cobalt occurs on the surface in the form of erythrite, a hydrous cobalt arsenate and in depth changes to smaltite, a cobalt diarsenide. Nickel is associated with these ores in small quantities, also some gold and silver. The concentrated ore contains a minimum of 13.25 per cent cobalt, 3 per cent nickel, and 21 per cent arsenic. In 1935, from an output of 4,160 tons of concentrate, the yield was 445 tons of cobalt, 208 tons of nickel, and 38 kilos of gold. Production started in 1932 with an output of 566 tons and up to the end of 1936 the total production was 10,300 tons. Practically all of the product is exported to smelters and refineries in Belgium."—(Foreign Minerals Quarterly, United States Bureau of Mines.)

In Chile development work was recently conducted on cobalt bearing deposits located near Puerto del Huasco, Province Atacama; the run of mine ore was reported to average about 1.75 per cent cobalt.

It was reported in 1937 by the American Consul in Paris that a representative of the French concern, Compagnie des Produits Chimiques et Electrometallurgiques Alais, Froges et Camarque, recently acquired 8,000 hectares of cobalt mining land in New Caledonia. The company, which does not belong to the International Cobalt Association, plans to supply its cobalt needs from New Caledonia.

Like others of the rarer metals, cobalt experienced a very big development in industrial demand in 1937, states the Mining Journal, London. It was due in part to the general increasing demand for alloys in all branches of engineering but the use of cobalt was exceptionally stimulated by the development in the research and production of synthetic hydro carbon oils; the annual loss of cobalt requiring replacement in this field of application is estimated at between 10 and 20 per cent of the total tonnage of catalyst employed.

Exports of cobalt contained in ore from Canada totalled 92,400 pounds valued at \$58,712 during 1937; exports of cobalt metal amounted to 7,576 pounds at \$10,834 and those of cobalt alloys, 51,939 pounds appraised at \$84,629. Exports of cobalt oxides and salts in 1937 totalled 597,869 pounds valued at \$754,965.

"Metal and Mineral Markets", New York, published cobalt ore prices, September, 1938, per pound of cobalt—8 to 9 per cent grade, 45 cents; 9 to 10 per cent, 50 cents; 10 to 11 per cent, 60 cents; 11 to 12 per cent, 65 cents; 12 to 13 per cent, 70 cents; 13 per cent and upward, 75 cents. Carload lots, f.o.b. Ontario.

Table 85 —Production of Cobalt in Canada, 1928-1937

Year	Pounds	Year	Pounds
1928.....	956,590	1933.....	466,702
1929.....	929,415	1934.....	594,671
1930.....	694,163	1935.....	681,419
1931.....	521,051	1936.....	887,591
1932.....	490,631	1937.....	507,064

Table 86 —Production in Canada, Imports and Exports of Cobalt, 1936 and 1937

	1936		1937	
	Quantity	\$	Quantity	\$
PRODUCTION (in terms of metallic cobalt contained in metal and oxides sold and in ores and residues exported)..... lb.	887,591	804,676	507,064	848,145
IMPORTS—				
Cobalt ore..... lb.			300	5
Oxide of cobalt..... lb.	410	610	617	871
EXPORTS—				
Cobalt, contained in ore..... lb.	526,200	212,814	92,400	58,712
Cobalt, metallic..... lb.	2,376	2,970	7,576	10,834
Cobalt, alloys..... lb.	43,211	70,372	51,939	84,629
Cobalt oxides and cobalt salts..... lb.	484,541	556,791	597,869	754,965

Table 87 —World Production of Cobalt, 1935-1937

(Supplied by the Imperial Institute)

(Cwt.)

Producing country	1935	1936	1937
BRITISH EMPIRE			
Northern Rhodesia.....	8,203	9,078	17,409
Canada (c).....	6,084	7,925	4,527
Burma (b).....	4,452	5,910	5,475
FOREIGN COUNTRIES			
Belgian Congo.....	(a)	13,480	30,000
French Morocco.....	8,759	7,700	10,900
Japan (ore).....	188	(a)	(a)

Complex ores containing cobalt are produced in Germany, Greece, Japan and China, but figures of cobalt content are not available.

(a) Information not available.

(b) Estimated cobalt content of nickel-speiss exported to Hamburg.

(c) Metal recovered from smelter products plus cobalt contained in cobalt residues exported.

SILVER

Canadian silver production in 1937 at 22,977,751 fine ounces and \$10,312,644 represents increases in quantity and value over 1936 of 25.3 per cent and 24.6 per cent respectively. The average price of the metal in Canadian funds was 44.88 cents per fine ounce in 1937 as against 45.13 cents in the preceding year. The greatest annual production of silver in Canada was in 1910, in which year an output of 32,869,264 fine ounces was recorded; the highest average yearly price per fine ounce for the metal in Canada was 111.122 cents in 1919.

Of the total silver produced in the Dominion in 1937 the mines of British Columbia contributed 50.2 per cent; Ontario 20.4 per cent; Yukon 17.2 per cent, and Quebec 3.9 per cent, with the balance originating in Manitoba, Saskatchewan, Northwest Territories and Nova Scotia.

World production of silver in 1937, as estimated by the American Bureau of Metal Statistics, totalled 273,322,943 fine ounces compared with 252,329,761 fine ounces in 1936. In order of production the principal silver producing countries of the world in 1937 were Mexico, United States, Canada, Peru and Australia.

Handy and Harman, New York, in a review of the silver market for 1937, state—"As in 1936, the silver market in 1937 was for the most part a colorless affair. Price fluctuations in New York were the narrowest on record, the spread between the high and low official quotations having been only 2 cents compared with 5 cents in 1936 . . .

"The steadiness of the market can be definitely ascribed to the silver policy pursued by the United States government . . . Exclusive of Treasury purchases, the demand during 1937 was far short of the supply, but the depressing effect on prices which such excess offerings would normally have exerted was rendered inoperative below the level at which the Treasury department stood ready to acquire silver. On the other hand, upward movements of the market above the government rate were short lived because of lack of official support at the higher figure . . .

"We estimate total United States government acquisitions for 1937 at 317,300,000 ounces, divided into the following classifications: from domestic ores, 69,900,000 ounces; from nationalization, 30,000 ounces; from open market purchases, including miscellaneous deposits at the Mints and Assay offices, 247,400,000 ounces. The total from these sources, added to the 1,859,600,000 ounces on hand at the beginning of the year amounts to 2,176,900,000 ounces, which represents our estimate of the United States Treasury silver holdings at December 31, 1937, and includes coin in circulation . . .

"The eight-nation (including Canada) silver control agreement terminated with the year 1937, and no effort was made to renew it . . . The pact, which became effective on January 1, 1934, for a four-year period, was made for the purpose of stabilizing world silver prices by means of absorbing production and limiting sales of silver through the combined action of certain governments. Subsequently, the stabilization program which this joint accord imposed was completely dwarfed by the magnitude of the purchases already made and still required under the provisions of the Silver Purchase Act, which became law six months later . . . It is also of interest to note that, in spite of these enormous purchases, the goal prescribed for silver in the United States monetary reserve has been approached by less than 200,000,000 ounces during the past three and one-half years . . ."

The Bank of Canada's weekly statement for March 23, 1938, as for December 31, 1937, showed silver bullion valued at \$2,992,623.24. This figure was reduced in subsequent weeks and as from May 18 has stood at nil.

On March 11, 1935, when the Bank of Canada commenced operations, the silver then held by the Government was transferred to that institution, which assumed the liability of the Dominion notes outstanding. The silver transferred to the Bank of Canada and future purchases by it will form part of the reserve of the Bank of Canada (Section 26 (a), Bank of Canada Act).

Results of research carried on by a group of American silver producers and which appeared in the Journal of the Franklin Institute show that progress has been made which may be of definite value to the silver industry. A very profitable line of research has been that dealing with the anti-friction properties of silver and silver alloys. Pure silver gave very good results. Steel-backed bearings lined with nearly pure silver are finding an increasing use in industry and have been, in fact, adopted as standard equipment in certain aeroplane engine parts. The value of silver salts as fungicides has been proven and certain salts have also been used with success in water sterilization, particularly in fish hatcheries. As a catalyst in the oxidation of ethyl alcohol, silver has given very satisfactory results.

CANADIAN COMMODITY EXCHANGE INC.—SILVER MARKET, 1937

(Contributed by the Canadian Commodity Exchange Inc., Montreal, P.Q.)

The silver market of 1937 lacked feature. Dominated by the United States' policy prices moved in a narrow range in colourless trading. On the Canadian Commodity Exchange, Inc., in Montreal, the spread between the high and low prices on the spot month delivery was just over five cents an ounce. In New York the spread between the high and low official quotations was only two cents.

On the Canadian Commodity Exchange the high for the year was reached in March, when contracts for delivery in that month sold at 46½ cents per ounce. London touched a high of 21½ pence an ounce and the New York official a high of 46¼ cents at about the same time. Demand from the Indian bazaars following the budget announcement at the end of February that the duty on silver imports into India would be advanced from 2 annas to 3 annas per ounce, accounted for the strength in the early part of the year. The subsequent decline in commodity prices, however, notably cotton, and mounting silver stocks in Bombay, brought a halt to Indian demand and prices declined.

The market subsequently fluctuated narrowly around the 44-45 cent level till December. Some selling occurred in August on the report of large Chinese exports, but the market was only temporarily disturbed and then resumed an even course.

A sharp dip occurred in December when the United States failed to announce whether it would renew premium payments on American mined silver, which were due to expire at the year-end. Another factor was the expiration of the eight-nation silver agreement. In Montreal the current delivery option dropped to a 1937 low of 41·20 cents an ounce. The London spot fixed price dipped to 18 3/16 pence.

On December 28, however, Secretary of the United States Treasury, Morgenthau, announced that the Treasury would continue to buy Mexican silver through January on the same basis as before. Two days later a similar policy was announced with regard to purchases from Canada and it was made known that the Chinese agreement for exchange of silver and gold had been extended to July 1, 1938. These measures steadied the market.

On the evening of December 31 President Roosevelt made a proclamation with respect to silver, which he, earlier in the month, had said would be forthcoming, by which the proclamation of December 21, 1933, was extended to December 31, 1938. The proclamation also reduced the Government's buying rate for newly-mined domestic silver from 77·57 cents an ounce to 64·64 cents per ounce 1,000 fine. The previous rate had been in effect since April 25, 1935.

The four-year silver agreement by eight nations was not renewed.

During 1937 a total of 503 contracts were executed on the Canadian Commodity Exchange, comprising 5,030,000 ounces of silver 999 fine. The March, May, September and December options were the most active. In 1936, 1,908 contracts or 19,080,000 ounces of silver sold on the Exchange.

Table 88 —Production of Silver in Canada, by Provinces and by Sources, 1936 and 1937

	1936		1937	
	Quantity	Value	Quantity	Value
	Fine oz.	\$	Fine oz.	\$
NOVA SCOTIA—				
In gold bullion and in silver-lead zinc ores exported—Total.....	107,642	48,576	26,990	12,113
QUEBEC—				
In blister copper.....	500,392	225,812	674,971	302,934
In gold ores and in copper and silver-lead zinc ores exported.....	223,947	101,060	233,619	104,850
Total.....	724,339	326,872	908,590	407,784
ONTARIO—				
In silver bullion and nuggets.....	1,863,183	840,798	1,527,149	685,400
In gold bullion.....	476,723	215,131	497,850	223,440
In blister copper.....	2,432,774	1,097,838	2,316,433	1,039,638
In ores, concentrates, residues and matte exported or treated in smelters outside the province.....	446,686	201,576	351,615	157,808
Total.....	5,219,366	2,355,343	4,693,047	2,106,286
MANITOBA—				
In blister copper.....	780,551	352,239	889,750	399,329
In gold bullion and in ores, slag, etc., exported.....	10,938	4,936	15,429	6,924
Total.....	791,489	357,175	905,179	406,253
SASKATCHEWAN—				
In blister copper (a).....	642,497	289,940	821,637	368,759
In gold bullion.....			181	81
Total.....	642,497	289,940	821,818	368,840
ALBERTA—				
In alluvial gold—Total.....	9	4	4	2
BRITISH COLUMBIA—				
In alluvial gold.....	7,810	3,525	9,748	4,375
In gold bullion.....	53,272	24,040	95,443	42,836
In base bullion and in ores exported.....	9,687,633	4,371,738	11,424,986	5,127,648
Total.....	9,748,715	4,399,303	11,530,177	5,174,859
YUKON—				
In alluvial gold.....	11,293	5,096	10,503	4,714
In silver-lead ores shipped to smelter.....	772,123	348,436	3,946,001	1,771,005
Total.....	783,416	353,532	3,956,504	1,775,719
NORTHWEST TERRITORIES—				
In pitchblende-silver or other ores shipped to smelters (x)—Total...	317,014	143,059	135,442	60,788
Canada—Total.....	18,334,487	8,273,804	22,977,751	10,312,644

(x) Comprises silver in silver sulphide, etc., made at the Eldorado refinery, Port Hope, Ont., plus silver in ores shipped to other metallurgical plants; in addition to quantity recorded for 1937 there were silver concentrates in transit, the silver content of which will be included with output for 1938.

(a) Represents silver contained in blister copper made at the Flin Flon smelter from Saskatchewan ores.

NOTE.—For 1937 silver was valued at 44·881 cents per fine ounce, the average price of the metal on the New York market expressed in Canadian funds; for 1936 the corresponding price was 45·127 cents.

Table 89 —Production of Silver in Canada for Years Specified, 1887-1937

Year	Ounces	Value	Cents per ounce	Year	Ounces	Value	Cents per ounce
		\$				\$	
1887.....	355,083	347,271	98-00	1927.....	22,736,698	12,816,677	56-37
1891.....	414,523	409,549	98-00	1928.....	21,936,407	12,761,725	58-18
1896.....	3,205,343	2,149,503	67-06	1929.....	23,143,261	12,264,308	52-99
1901.....	5,530,192	3,265,354	58-95	1930.....	26,443,823	10,089,376	38-15
1906.....	8,473,379	5,659,455	66-79	1931.....	20,562,247	6,141,943	29-87
1910(*).....	32,869,264	17,580,455	53-49	1932.....	18,347,907	5,811,081	31-67
1911.....	32,559,044	17,355,272	53-30	1933.....	15,187,950	5,746,027	37-83
1916.....	25,459,741	16,717,121	65-66	1934.....	16,415,282	7,790,840	47-46
1919.....	16,020,657	17,802,474	(a) 111-122	1935.....	16,618,558	10,767,148	64-79
1920.....	13,330,357	13,450,320	100-90	1936.....	18,334,487	8,273,804	45-13
1925.....	20,228,988	13,971,150	69-06	1937.....	22,977,751	10,312,644	44-88

(*) Year of maximum output.

(a) Highest price per ounce recorded since 1887. The greatest annual value of total Canadian silver production was attained in 1918 in which year an output of 21,383,979 fine ounces was valued at \$20,693,704 or 96-772 cents per ounce.

Table 90 —Production of Silver, by Principal Silver-producing Provinces, 1928-1937

Year	Quebec		Ontario		Manitoba		British Columbia		Yukon Territory†	
	Fine ounces	Value	Fine ounces	Value	Fine ounces	Value	Fine ounces	Value	Fine ounces	Value
		\$		\$		\$		\$		\$
1928.....	908,959	528,796	7,242,601	4,213,456	1,763	1,026	10,943,367	6,366,413	2,839,633	1,651,985
1929.....	813,821	431,268	8,890,726	4,711,402	2,644	1,401	10,156,408	5,382,185	3,279,530	1,737,922
1930.....	571,164	217,922	10,205,683	3,893,876	94,653	36,114	11,825,980	4,512,065	3,746,326	1,429,373
1931.....	530,345	158,414	7,438,951	2,222,014	836,547	249,877	8,061,599	2,408,000	3,694,728	1,103,615
1932†.....	628,902	199,184	6,335,788	2,006,648	1,036,497	328,275	7,293,462	2,309,958	3,053,188	966,994
1933.....	471,419	178,351	4,535,680	1,715,975	1,101,578	416,758	6,737,057	2,548,817	2,227,476	842,717
1934.....	470,254	223,187	5,321,160	2,525,470	1,252,920	594,647	8,729,721	4,143,204	553,320	262,611
1935.....	668,836	433,338	5,161,561	3,344,229	1,206,454	781,660	9,178,400	5,946,677	201,221	130,371
1936.....	724,339	326,872	5,219,366	2,355,343	791,489	357,175	9,748,715	4,399,303	1,100,430	496,591
1937.....	908,590	407,754	4,693,047	2,106,286	905,179	406,253	11,530,177	5,174,859	4,091,946	1,836,507

†Northwest Territories' production included with Yukon since 1932, see chapter I and preceding reports.

For data relating to silver in mine shipments from Cobalt District and nearby camps in Ontario, see previous reports.

In 1935 Saskatchewan was credited with 201,608 fine ounces valued at \$130,622, representing the estimated metal recovered from that part of the Flin Flon mine situated in Saskatchewan. In 1936, Saskatchewan production from the same source was 642,497 fine ounces valued at \$289,940 and in 1937 production from Saskatchewan totalled 821,818 fine ounces valued at \$368,840.

Table 91 —Source of Canadian Silver Production, by Percentages, 1932-1937

Source	1932	1933	1934	1935	1936	1937
In silver-cobalt ores.....	28-5	20-4	18-7	15-0	12-2	7-9
In base bullion*.....	29-2	34-6	45-1	47-9	46-3	41-7
In gold ores (bullion and placer).....	2-5	3-0	7-2	7-4	9-7	7-8
In blister copper.....	15-5	19-5	23-4	26-1	23-8	20-5
In matte, copper ores and silver-lead ores, etc., exported....	24-3	22-5	5-6	3-6	8-0	22-1
	100-0	100-0	100-0	100-0	100-0	100-0

*Chiefly from silver-lead ores.

Table 92 —Average Commercial Ratio of Silver to Gold for Each Specified Year Since 1700

(Supplied by United States Mint)

Year	Year	Year
1700.....	14-81	1895.....
1750.....	14-55	1900.....
1800.....	15-68	1905.....
1850.....	15-70	1910.....
1875.....	16-64	1915.....
1880.....	18-05	1920.....
1885.....	19-41	1925.....
1890.....	19-75	1930.....
		31-60
		33-33
		33-87
		38-22
		40-48
		40-48
		20-28
		29-78
		53-74
		1931.....
		1932.....
		1933.....
		1934.....
		1935.....
		1936.....
		1937.....
		71-25
		73-29
		59-06
		72-49
		54-10
		77-09
		77-44

Table 93 —Silver Consumed in Specified Canadian Industries, 1936 and 1937

	1936		1937	
	Fine oz.	Value	Fine oz.	Value
		\$		\$
Scientific equipment.....	(a) 657,042	320,467	628,001	296,628
Fountain pens and pencils.....				
Jewellery and silverware—Fine silver.....		296,222		480,215
Jewellery and silverware—Silver alloys.....		47,175		414,474
Medicinal and pharmaceutical preparations (bullion).....	46,426	21,285	45,296	20,699
Miscellaneous chemicals.....	19,000	8,740	17,010	7,654

(a) Consumed largely in the manufacture of photographic film.

Table 94 —Imports into Canada and Exports of Silver, 1936 and 1937

	1936		1937	
	Quantity	Value	Quantity	Value
	Fine oz.	\$	Fine oz.	\$
IMPORTS—				
Silver in bars, etc., unmanufactured.....		2,389,842	1,987,082	870,388
Silver, manufactures of, n.o.p., and articles consisting wholly or in part of sterling or other silverware.....		115,513		362,439
Toilet articles of which the most important component, in value, is sterling silver.....		43,234		60,452
Total.....		2,548,589		1,293,279
EXPORTS—				
Silver contained in ore, concentrates, etc. (c).....	3,347,167	1,494,237	5,769,332	2,567,412
Silver bullion—Domestic (a).....	12,783,708	5,789,310	14,620,025	6,556,357
Total.....	16,130,875	7,283,547	20,389,357	9,123,769
Silver bullion—Foreign (b).....	3,093,263	1,410,827	670,550	303,753
Silver coin—Foreign.....		931,129		1,353,988
Silver coin—Canadian.....		65,446		58,288

(a) Of the quantity exported, 11,239,967 ounces in 1937 and 11,264,615 ounces in 1936 went to the United States.

(b) Of these exports, 426,617 ounces went to the United States in 1937 and 2,892,275 ounces in 1936.

(c) Of the quantity exported in 1937, 5,324,684 ounces went to the United States.

Table 95 —Monthly Average Prices of Silver, 1935-1937

(From the Engineering and Mining Journal)

Month	New York (Cents per fine ounce) ·999 fine			London Spot (Pence per standard ounce) ·925 fine		
	1935	1936	1937	1935	1936	1937
January.....	54·418	47·250	44·913	24·584	20·250	20·734
February.....	54·602	44·750	44·750	24·818	19·796	20·083
March.....	59·048	44·750	45·130	27·380	19·663	20·677
April.....	67·788	44·892	45·460	30·986	20·245	20·740
May.....	74·356	44·869	45·025	33·865	20·248	20·346
June.....	71·940	44·750	44·818	32·346	19·770	20·022
July.....	68·216	44·750	44·750	30·500	19·590	19·986
August.....	66·366	44·750	44·750	29·476	19·490	19·848
September.....	65·375	44·750	44·750	29·255	19·579	19·889
October.....	65·375	44·750	44·750	29·368	19·977	19·942
November.....	65·375	45·431	44·750	29·284	21·050	19·707
December.....	58·420	45·352	44·750	25·563	21·238	18·835
Average.....	64·273	45·087	44·883	28·952	20·075	20·067

The average price of silver in Canadian funds based on the New York market in 1935, was 64·7899 cents per fine ounce, in 1936 it was 45·12654 cents, and in 1937 it was 44·883 cents.

Table 96 —Comparative Figures of Silver Production, for the World, Mexico, the United States, Peru, and Canada, 1928-1937

Year	World's Output*	Mexico's Output*	United States Output*	Peru's Output*	Canada's Output
	fine ounces	fine ounces	fine ounces	fine ounces	fine ounces
1928.....	257,925,154	108,537,307	58,426,004	21,607,693	21,936,407
1929.....	290,970,029	108,871,442	61,233,321	21,495,169	23,143,261
1930†.....	247,000,000	105,204,059	47,724,903	14,372,593	26,443,823
1931.....	197,000,000	86,064,457	29,856,628	8,794,407	20,562,247
1932 (a).....	155,000,000	69,303,119	22,739,681	3,518,753	18,347,907
1933.....	173,000,000	68,101,062	23,128,783	7,316,828	15,187,950
1934.....	193,000,000	74,143,301	32,782,304	10,366,607	16,415,282
1935.....	223,000,000	75,587,447	48,518,639	17,103,768	16,618,568
1936.....	249,000,000	77,462,114	61,152,534	19,914,482	18,334,487
1937.....	271,000,000	84,678,921	70,986,073	16,993,204	22,977,761

* Prior to 1930 from Annual Report of the "Director of the Mint," Washington.

† Beginning with 1930, figures from the Imperial Institute.

(a) Excluding the production of U.S.S.R. (Russia) figures for which are not available.

NOTE.—For years 1898 to 1926, see previous reports.

Table 97 —World Production of Silver Ore, 1935-1937

(In terms of metal)

(Supplied by the Imperial Institute)

(Fine troy ounces)

Producing Country	1935	1936	1937	Producing Country	1935	1936	1937
BRITISH EMPIRE				FOREIGN COUNTRIES			
United Kingdom.....	92,848	76,885	71,448	Poland.....	32,000	61,000	(a)
Bechuanaland Protectorate.....	1,759	1,378	1,499	Portugal.....		12,905	178
Gold Coast (estimated).....	12,000	14,000	19,000	Roumania.....	471,872	594,694	813,044
Kenya.....	3,743	5,721	7,549	Spain.....	1,450,000	(a)	(a)
Nigeria.....	139,200	153,000	102,120	Sweden.....	835,771	939,519	946,239
Northern Rhodesia.....	151	229,151	83,861	U. S. S. R. (estimated).....	3,900,000	5,000,000	5,000,000
Sierra Leone.....	1,673	1,537	1,568	Yugoslavia.....	1,753,493	1,785,579	2,242,495
Southern Rhodesia.....	132,087	145,072	152,038	Algeria.....	46,521	65,545	72,177
South West Africa (c).....			358,500	Belgian Congo.....	3,793,893	2,781,457	2,961,787
Tanganyika Territory.....	6,134	9,254	11,696	Morocco (French).....		725	241,543
Uganda.....	346	924	1,379	Mozambique.....		1,337	(a)
Union of South Africa.....	1,042,203	1,075,625	1,100,641	Tunis.....	17,007	43,000	174,638
Canada.....	16,618,558	18,334,487	22,977,751	Mexico.....	75,587,447	77,462,114	84,678,921
Newfoundland.....	1,123,997	1,249,472	1,447,637	Porto Rico.....	8	187	1
British Guiana (estimated).....	4,010	4,240	4,740	United States.....	48,518,639	61,152,534	70,986,073
Burma.....	5,825,913	5,952,000	6,180,000	Guatemala (d).....	3,345		(a)
Cyprus (b).....	44,536	125,704	132,968	Honduras.....	2,641,346	3,104,507	3,211,296
India.....	24,493	25,345	24,642	Nicaragua.....	88,543	111,175	(a)
Federated Malay States (estimated).....	2,600	3,300	3,000	Panama.....	3,370	4,632	(a)
Australia.....	11,562,373	12,288,033	14,059,258	Salvador.....	2,983	3,542	2,866
Fiji.....	634	1,185	3,463	Argentina.....	(a)	522,800	(a)
New Guinea (estimated).....	83,000	97,000	96,000	Bolivia (exports).....	7,951,338	10,723,000	9,452,000
New Zealand.....	437,967	432,973	443,981	Brazil.....	20,833	23,887	(a)
Total.....	37,200,000	40,200,000	47,300,000	Chile.....	1,298,725	1,498,129	1,786,222
FOREIGN COUNTRIES				Colombia.....	132,965	151,501	167,971
Austria.....	18,318	3,848	3,989	Ecuador.....	80,266	74,410	(a)
Bulgaria.....	18,454	(a)		Guiana (French and Dutch) (estimated).....	6,000	6,000	6,000
Czechoslovakia.....	1,028,645	1,003,862	1,056,552	Peru.....	17,103,768	19,914,482	16,993,204
Finland.....	60,056	58,706	55,137	Venezuela (estimated).....	7,000	7,000	(a)
France.....	569,602	476,849	563,847	China.....	150,000	150,000	(a)
Germany.....	6,257,700	6,541,400	6,773,169	French Indo-China.....	3,633	5,594	3,537
Greece.....	217,906	526,623	913,687	Japan.....	8,230,535	9,605,231	10,000,000
Hungary.....	13,263	8,299	(a)	Korea.....	1,265,000	1,891,000	(a)
Italy.....	420,000	630,000	715,000	'Manchoukuo'.....	3,497	(a)	(a)
Norway.....	266,080	229,538	283,249	Netherlands East Indies.....		701,700	500,084
				Philippine Islands.....	322,020	467,885	719,771
				Total.....	186,000,000	209,000,000	224,000,000
				World's Total.....	223,600,000	249,000,000	271,000,000

(a) Information not available.

(b) Exports.

(c) Years ended March 31, following.

(d) Imported into the United States from Guatemala.

Table 98 —World's Silver Consumption, Production and Other Supplies*, 1936 and 1937

Consumption	1937	1936	Production and Supplies	1937	1936
(In millions of fine ounces)			(In millions of fine ounces)		
U.S. Government Acquisitions—			Production:—		
Domestic production.....	69.9	61.1	United States.....	68.4	62.8
Nationalized stocks.....		0.4	Mexico.....	88.0	77.5
Open market purchases.....	247.4	270.1	Canada.....	24.3	19.3
	317.3	331.6	South America.....	32.3	31.3
Other Government Purchases under Eight			All other countries.....	63.0	59.8
Nation Silver Pact:			Total Production.....	276.0	250.7
Mexico.....	7.2	7.2			
Canada.....	1.7	1.7	Sales by China (Hong Kong sales are in-		
Peru.....	1.1	1.1	cluded in 1936 figure).....	174.3	302.0
Australia.....	0.6	0.6	Other Sales—		
Coinage:—			Hong Kong.....	3.6	
China.....	3.0		French Indo-China.....	4.5	
Cuba.....	7.6	7.9	Rumania.....	6.0	
Honduras.....	1.7		Germany.....	0.1	1.0
Venezuela.....		2.8	Soviet Union.....	0.1	1.0
Great Britain.....	6.0		Total.....	464.6	554.7
Red Sea District.....	10.0				
Indian consumption.....	58.0	100.0			
German consumption.....	15.9	16.0			
Arts and Industries—					
In the United States and Canada.....	31.5	26.5			
In England.....	15.0	12.0			
Total.....	476.6	507.4			

(*) From Handy and Harman's Review of the Silver Market, 1937.

Table 99 —World's Monetary Stocks of Silver at the Close of 1937.

(Supplied by the United States Mint and subject to revision)

(Stated in United States money, 000's omitted)

Country	Silver stock in banks and treasuries (*)	1937	Country	Silver stock in banks and treasuries (*)	1937
	\$	Per capita		\$	Per capita
United States (including Hawaii, Alaska and Porto Rico) (13).....	2,286,689	17.75	Yugoslavia.....	23,128	1.50
Canada (1) (13).....	32,364	2.91	British Malaya.....	16,514	3.29
Mexico (2).....	60,495	2.15	Indo-China—French (3).....	4,973	0.21
Cuba (2) (Sept. 30-1937).....	69,394	15.87	Iran (Persia) (4).....	21,752	1.45
Chile.....			Palestine.....	5,546	4.01
Colombia (4).....	5,138	0.57	Syria.....	1,826	0.52
Peru.....	5,627	0.92	Turkey (3).....	11,068	0.67
Venezuela.....	38,813	11.32	British West Africa (12) (9).....	6,303	0.25
Uruguay (4).....	4,066	1.94	Nyasaland.....	5,969	3.68
Austria (4).....	1,492	0.22	Rhodesia, Northern (3).....	344	0.25
Belgium (4) (5).....	5,634	0.68	Rhodesia, Southern (4).....	697	0.54
France.....	101,980	2.43	New Zealand (2).....	9,326	5.88
Germany.....	473,602	6.96	Ceylon.....	10,378	1.83
Bulgaria (7).....	21,137	3.34	China (10).....	450,000	1.00
Czechoslovakia (2) (3).....	19,994	1.31	India—British (4).....	242,772	0.66
Denmark.....			Morocco.....	2,517	0.41
Hungary.....	2,127	0.24	Japan (including Chosen, Taiwan, Kwantung) (3).....	96,910	0.95
Lithuania.....	4,789	1.88	Netherlands East Indies (4) (13) (Jan. 1-1938).....	9,905	0.15
Great Britain (6) (14).....	299,784	6.34	Philippine Islands (7).....	18,972	1.41
Greece.....	2,793	0.40	Siam (13).....	32,263	2.24
Eire (8).....	4,694	1.59	Egypt.....	22,475	1.40
Latvia.....	8,512	4.32	Ethiopi (3) (11).....	19,141	3.48
Netherlands.....	90,131	10.42	Kenya, Uganda and Tanganyika (12).....	17,910	1.45
Norway.....			Sudan—Anglo Egyptian.....	7,997	1.34
Poland.....	72,002	2.08	Union of South Africa.....	14,695	1.48
Rumania (2).....	34,912	1.78	Australia (13) (June 30-1938).....	41,582	6.06
Spain (3) (4).....	42,637	1.72	Algeria and Tunis (4).....	4,074	0.40
Switzerland.....	46,295	11.07	Other countries.....	62,740	
Italy.....			Total.....	4,923,157	2.38
Portugal (2) (3).....	7,577	1.04			
Sweden (10).....	18,700	2.98			

(*) Monetary silver stock in government treasuries, in banks, and when data available, in circulation. United States equivalent of reported face value at exchange rates.

(1) Net issues of silver coin since 1858 and silver bullion at the Bank of Canada.

(2) Includes base metal coin.

(3) Prior year's figures at new equivalents where equivalents other than the legal parity are applicable.

(4) Silver in circulation not included.

(5) On Dec. 25th 1937.

(6) On December 24, 1937.

(7) Silver converted to United States equivalent at legal rate.

(8) Exclusive of British coins and currency which still circulate in the Irish Free State.

(9) Net issues of silver coin.

(10) Estimated.

(11) Silver valued at United States equivalent of the price of silver in London on December 31, 1937. (\$0.47148 per fine ounce).

(12) On June 30, 1937.

(13) Includes silver bullion.

(14) Includes British coin circulating in Eire.

Table 100 — Silver Content of the Principal Coins

Supplied by the American Bureau of Metal Statistics.

Country	Coin	Fine Silver Content, Grains per Unit	Country	Coin	Fine Silver Content, Grains per Unit
United States.....	Dollar.....	371-250	Indo-China.....	Piaster.....	277-700
	Half-dollar.....	173-610	Iran.....	Rial.....	63-900
	Quarter.....	86-805	Italy.....	5-lira.....	64-430
	Dime.....	34-722	Japan.....	Yen.....	110-000
Australia.....	Shilling.....	80-730	Mexico.....	Toston.....	51-779
Austria.....	Schilling.....	59-250	Nicaragua.....	Cordoba.....	347-230
Bolivia.....	Boliviano.....	185-190	Peru.....	Sol.....	192-905
Brazil.....	Milreis.....	30-850	Philippine Islands.....	Peso.....	246-920
Canada.....	Dollar.....	288-000	Poland.....	2-zloty.....	50-927
Chile.....	Peso.....	69-400	Portugal.....	10-escudo.....	16-110
China.....	Yuan.....	362-559		5-escudo.....	13-890
Colombia.....	Peso.....	347-230	Russia.....	Rouble.....	277-782
Costa Rica.....	Colon.....	138-300	Salvador.....	Colon.....	347-230
Ecuador.....	Sucre.....	55-560	Siam.....	Baht.....	208-340
France.....	10-franc.....	104-940	Spain.....	5-peseta.....	69-440
Germany.....	Mark.....	38-581		2-peseta.....	64-430
Great Britain.....	Shilling.....	43-636	Sweden.....	2-krona.....	92-590
Greece.....	20-drachma.....	4-370		5-krona.....	69-440
India.....	Rupee.....	165-000	Uruguay.....	Peso.....	347-230

LEAD

The quantity of primary lead produced in Canada during 1937 and inclusive of the recoverable metal contained in ores exported totalled 411,999,484 pounds valued at \$21,053,173; this quantity was the greatest ever recorded in the history of Canadian mining and its value was only surpassed by the all-time high record of \$23,127,460 in 1925. The average price of lead in Canadian funds was 5.110 cents per pound in 1937 compared with a corresponding price of 3.913 cents in 1936. The 1937 average price was the highest since that of 5.256 cents per pound in 1927.

Reviewing lead for 1937, in the "Mining Journal", London, Mr. O. W. Roskill states—"Bearing in mind that world consumption of lead during 1936 and the first quarter of 1937 was well above production, the steady upward trend in prices, which finished with a spurt in March, 1937, when the price for prompt touched £36 7s. 6d. was a reasonable reflection of the improved statistical position of the metal. Unfortunately, however, the high price reached in the boom was due to speculative interest and when the speculative support was withdrawn, following the check to undue optimism provided by the original N.D.C. proposals and other factors, the price fell away sharply. Even at the end of 1936 the rising prices of base metals had led to a revival of interest in base metal mining activity, but in the first half of 1937 mining prospects appeared so good that there was a general move towards reopening properties that had been shut down for some years."

Lead consumption of the world during 1937 was estimated at 1,740,800 metric tons by the American Bureau of Metal Statistics; this was the highest ever recorded having exceeded the previous record of 1929 by 3 per cent. Of the total 1937 world consumption of the metal, United States accounted for 502,500 metric tons, Great Britain 346,700; Germany 235,600; Japan 120,000, and France 107,300.

Table 101 — Production (†) of New Lead in Canada, 1928-1937

Year	Pounds	\$	Price per pound (Canadian funds)
1928.....	337,946,688	15,553,231	c. 4-576
1929.....	326,522,566	16,544,248	5-054
1930.....	332,894,163	13,102,635	3-927
1931.....	267,342,482	7,260,183	2-710
1932.....	255,947,378	5,409,704	2-114
1933.....	266,475,191	6,372,998	2-392
1934.....	346,275,576	8,436,658	2-346
1935.....	339,105,079	10,624,772	3-133
1936.....	383,180,909	14,993,869	3-913
1937*.....	411,999,484	21,053,173	5-110

Maximum annual value of Canadian lead production was \$23,127,460 in 1925.

(*) Year of maximum output of Canadian lead.

(†) Refined lead plus lead in ores exported.

Table 102 —Production of Lead from Canadian Ores, by Provinces, 1928-1937

Year	Quebec		Ontario		British Columbia		Yukon and Northwest Territories	
	Pounds	Value \$	Pounds	Value \$	Pounds	Value \$	Pounds	Value \$
1928.....	6,218,336	284,520	6,814,757	402,289	317,722,146	14,537,377	7,191,449	329,045
1929.....	5,358,304	270,616	4,769,506	294,431	307,999,153	15,555,189	8,395,603	424,012
1930.....			2,193,856	116,034	321,803,725	12,637,232	8,896,582	349,369
1931.....			985,633	41,647	261,902,236	7,097,812	4,454,613	120,724
1932.....			86,477	1,828	252,007,574	5,326,432	3,853,327	81,444
1933.....			29,910	692	263,345,776	6,298,178	3,099,505	74,128
1934.....			21,558	525	344,467,138	8,392,597	1,786,880	43,536
1935.....	2,047,624	64,156	22,532	706	336,784,326	10,552,059	231,418	7,250
1936.....	2,047,689	80,126	17,442	683	376,645,367	14,738,133	2,568,699	100,513
1937.....	1,521,182	77,732	29,849	1,525	403,589,913	20,623,445	6,440,454	329,107

In addition there were 19,179 pounds valued at \$601 produced in Manitoba in 1935 and 1,901,712 pounds valued at \$74,414 produced in Nova Scotia in 1936. Nova Scotia production in 1937 totalled 418,086 pounds valued \$21,364.

Table 103 —Refined Lead Production in Canada,* 1928-1937

Year	Pounds of refined lead produced	Year	Pounds of refined lead produced
1928.....	301,067,819	1933.....	254,565,861
1929.....	304,449,673	1934.....	†314,457,735
1930.....	304,471,706	1935.....	†327,515,277
1931.....	278,448,457	1936.....	†363,449,490
1932.....	253,136,522	1937.....	†399,394,939

* Includes the electrolytic lead produced from Canadian and foreign ores at Trail, B.C.; and also the pig lead from Galetta, Ont., until 1931. †Primary lead only.

Table 104 —Imports into Canada and Exports of Lead, 1936 and 1937

	1936		1937	
	Pounds	Value \$	Pounds	Value \$
IMPORTS—				
Old and scrap, pig and block.....	63,879	4,234	79,327	6,148
Bars and sheets.....	36,192	2,117	45,694	3,391
Litharge.....	1,968,600	124,001	2,560,500	194,421
Acetate of lead.....	128,569	8,637	177,352	13,552
Nitrate of lead.....	163,283	9,292	312,776	23,739
Other manufactures.....		79,823		88,183
Pipe lead.....	24,084	1,818	9,061	1,488
Shots and bullets.....	8,066	828	3,327	350
Tea lead.....			1,000	85
Lead arsenate.....	223,300	20,096	237,992	19,565
Lead tetraethyl, compounds of.....	3,019,356	1,414,720	4,518,567	2,032,333
Lead capsules for bottles.....		63,964		90,644
Lead pigments—				
Dry white lead.....	21,302	1,458	42,818	3,360
White lead, ground in oil.....	15,137	1,348	15,116	1,499
Dry red lead and orange mineral.....	847,859	55,353	679,276	53,805
Total.....		1,787,689		2,532,563
EXPORTS—				
Lead, contained in ore, etc.—				
To—United States.....	2,724,800	119,513	10,437,500	598,847
Belgium.....	5,676,200	154,431	5,777,800	252,346
Total Lead in Ore.....	9,395,500	287,569	16,529,600	862,850
Pig lead, refined lead, etc.—				
To—United Kingdom.....	200,687,700	6,248,505	230,665,800	10,886,174
United States.....	1,300	76	1,000	71
Japan.....	98,560,300	3,140,296	86,385,300	4,297,535
France.....	5,878,500	182,159	14,495,400	721,399
China.....	5,967,900	193,229	6,216,000	316,109
Brazil.....	6,471,400	224,247	7,887,900	404,024
Germany.....	595,700	18,999	929,500	45,031
Other countries.....	3,188,100	105,771	6,558,700	307,803
Total Pig Lead.....	321,350,900	10,113,282	353,139,600	16,978,147
Total Lead Exports.....	330,746,400	10,400,851	369,669,200	17,840,997

Table 105 —Monthly Average Prices of Pig Lead, Montreal, New York and London, 1935-1937

Month	Montreal (Value in cents per pound)			New York (Value in cents per pound)			London (Value in pounds sterling per long ton)		
	1935	1936	1937	1935	1936	1937	1935	1936	1937
January.....	3.25	4.36	6.67	3.69	4.50	6.00	10.321	15.397	27.272
February.....	3.25	4.52	6.79	3.53	4.52	6.24	10.216	16.022	28.319
March.....	3.32	4.61	7.69	3.58	4.60	7.19	11.012	16.608	33.027
April.....	3.43	4.37	6.25	3.69	4.60	6.18	12.231	16.097	26.014
May.....	3.69	4.13	5.84	3.96	4.60	6.00	13.861	15.530	24.000
June.....	3.71	4.09	5.63	4.02	4.60	6.00	13.776	15.170	22.878
July.....	3.88	4.21	5.88	4.12	4.60	6.00	14.451	15.856	23.932
August.....	4.16	4.41	5.70	4.25	4.60	6.45	15.774	16.772	22.606
September.....	4.30	4.69	5.32	4.41	4.60	6.40	16.262	18.009	20.990
October.....	4.72	4.68	4.82	4.51	4.63	5.74	18.209	18.446	18.259
November.....	4.74	5.38	4.58	4.50	5.11	5.03	17.938	21.723	16.706
December.....	4.66	6.25	4.40	4.50	5.55	4.88	16.803	25.560	15.905
Average.....	3.93	4.64	5.80	4.06	4.71	6.01	14.238	17.599	23.326

The average price of lead for 1935, based on daily quotations in London and transposed to Canadian funds, was 3.1332 cents per pound; the average price of lead, based on the same market was 3.9128 cents for 1936 and 5.11 cents in 1937.

Table 106 —Available Statistics on the Consumption of Lead in Specified Canadian Manufacturing Industries, 1936 and 1937

Industries	Items Used		1936	1937
			Pounds	Pounds
Brass and copper products.....	Pig lead.....		611,911	804,379
	Scrap and other lead.....		141,644	306,379
Paints and pigments.....	Pig lead†.....		15,648,292	14,442,025
White metal alloys.....	Pig lead.....		9,624,097	10,818,139
	Scrap lead.....		11,654,207	12,082,034
Electrical apparatus.....	Pig lead.....		18,753,513	21,054,881
	Scrap lead.....		160,456	129,400
	Lead sheets, etc.....		821,732	798,603
Iron and steel.....	Lead.....		1,150,749	1,810,495
Grand Total.....			58,566,601	62,246,335

† Some products such as lead oxides made from pig lead by the paints and pigments industry are sold to other industries for the manufacture of such products as storage batteries.

Table 107 —World Production of Lead Ore, 1935-1937

(In terms of metal)

(Supplied by the Imperial Institute)

(Long tons)

Producing Country	1935	1936	1937	Producing Country	1935	1936	1937
BRITISH EMPIRE				FOREIGN COUNTRY			
United Kingdom.....	41,230	30,493	26,395	Portugal.....		3	1,289
Nigeria.....	690	830	554	Roumania.....	4,890	6,089	8,305
Northern Rhodesia.....	5,867	7,080	3,890	Spain (smelter).....	61,751	(c) 45,000	(c) 30,000
Southern Rhodesia.....			24	Sweden.....	8,727	9,518	9,124
South West Africa (d).....			10,100	U.S.S.R. (smelter).....	36,000	50,000	(c) 55,000
Tanganyika.....			32	Yugoslavia.....	64,000	65,000	70,000
Union of South Africa.....	5	6	102	Algeria.....	1,300	2,673	3,959
Canada (b).....	151,386	171,063	183,928	Belgian Congo.....			4,768
Newfoundland.....	35,010	30,937	28,778	French Equatorial Africa.....			120
Burma.....	89,400	90,900	91,200	Morocco (French).....	118	7,446	15,866
Federated Malay States.....	23	2		Tunis.....	5,546	10,118	12,859
Australia.....	221,793	223,749	246,045	Guatemala (estimated).....	40	40	50
Total.....	545,000	555,000	591,000	Mexico (b).....	181,284	212,317	204,688
FOREIGN COUNTRIES				United States (b).....	295,628	332,963	415,212
Austria.....	5,498	5,846	8,552	Argentina.....	2,494	6,741	15,400
Bulgaria.....	505	60	160	Bolivia (exports).....	9,588	14,288	17,914
Czechoslovakia.....	3,786	3,881	3,841	Chile.....	101	187	(a)
Finland.....	337	367	243	Peru.....	28,094	29,967	38,119
France.....	3,287	3,120	4,567	China.....	4,000	4,000	(a)
Germany.....	59,701	67,524	77,652	French Indo-China.....		31	
Greece.....	6,200	3,465	7,134	Japan (smelter).....	7,325	8,094	10,000
Italy.....	21,600	30,000	34,800	Korea (smelter).....	1,701	2,695	5,758
Norway.....	325	435	352	Turkey.....	2,600	5,286	7,600
Poland.....	6,000	7,000	10,000	Total.....	820,000	930,000	1,070,000
				World's Total.....	1,370,000	1,490,000	1,660,000

(a) Information not available.

(b) Amount estimated as recoverable.

(c) Estimated.

(d) Years ended March 31 following.

Table 108 —World Metal Production of Lead, 1935-1937

(Supplied by the Imperial Institute)

(Long tons)

Producing Country	1935	1936	1937	Producing Country	1935	1936	1937
BRITISH EMPIRE				FOREIGN COUNTRIES— Concluded			
United Kingdom.....	22,000	13,600	10,150	Norway.....	568	223	232
Northern Rhodesia.....	182	300	559	Poland.....	18,522	14,784	17,309
South-West Africa.....			1,355	Roumania.....	4,485	4,707	6,619
Canada.....	146,212	162,254	178,301	Spain.....	61,751	45,000	(e) 30,000
Burma.....	72,060	73,155	77,650	U.S.S.R.....	36,000	50,000	(e) 55,000
Australia (d).....	217,934	192,954	228,530	Yugoslavia.....	7,822	5,712	3,972
Total.....	458,000	442,000	497,000	Tunis.....	24,989	20,715	24,367
FOREIGN COUNTRIES				Mexico.....	170,886	199,782	198,019
Austria.....	7,921	8,594	10,665	United States.....	289,432	356,338	416,549
Belgium (b).....	67,891	65,942	91,836	Argentina.....	4,038	10,500	11,200
Czechoslovakia.....	4,729	4,740	4,983	Chile.....			516
France.....	14,345	14,468	37,700	Peru.....	7,560	9,291	(f) 15,538
Germany (c).....	126,247	150,956	170,451	French Indo-China.....	18	12	8
Greece.....	6,321	4,314	9,118	Japan.....	7,325	8,094	10,000
Hungary.....	13	25	145	Korea.....	1,701	2,695	5,758
Italy.....	35,604	36,239	38,857	Total.....	900,000	1,010,000	1,150,000
				World's Total.....	1,360,000	1,450,000	1,650,000

(b) Includes base bullion as follows:—

1935.....	1,978 long tons
1936.....	1,841 " "
1937.....	8,405 " "

(c) Includes some secondary. Figures as published by Metallgesellschaft, which exclude secondary, are—

1935.....	120,400 long tons
1936.....	136,800 " "
1937.....	159,800 " "

(d) Includes base bullion as follows:—

1935.....	36,723 long tons
1936.....	33,450 " "
1937.....	41,773 " "

(e) Estimated.

(f) Exports.

ZINC

Production of primary zinc in Canada and inclusive of the metal contained in ores exported totalled 370,337,589 pounds valued at \$18,153,949 in 1937. This represents an all-time high record for both quantity and value of Canadian zinc output. The average price per pound in 1937 was 4·90 cents as against 3·31 cents in the preceding year.

World production of zinc metal in 1937 amounted to 1,830,335 short tons compared with 1,639,727 short tons in 1936, according to the American Bureau of Metal Statistics. In output of zinc recoverable from mine shipments, Canada was exceeded by only the United States and in output of refined metal by the United States, Belgium and Germany.

A review of lead and zinc for 1937 by O. W. Roskill, The Mining Journal, London, states—“Lead and zinc, in common with other base metals, experienced a very satisfactory year in 1937 and although prices fell away after the boom in March their average levels for the year compare favourably with those of 1929. As in the case of the other non-ferrous metals, the consumption of zinc declined in the latter half of 1937. As far as the United Kingdom and Belgium were concerned this was probably largely due to the rapid decline, in the last four months of the year, in the exports of galvanized sheets. Both in Germany and in Italy the consumption of zinc continued to expand, but since zinc is the metal in which these autarkic countries are most nearly self-sufficient, its use is being developed for the displacement of other metals . . . Total production of zinc in Belgium showed a considerable increase over 1936 and production in 1937 surpassed the previous high record attained in 1928; almost the entire supply of concentrates to Belgian smelters is imported and in 1937 there was a marked increase in imports from Canada, India, Mexico and Sweden”.

Mine production of recoverable zinc in the United States increased 9 per cent in 1937 over 1936. The greater part of the increase was contributed by the Eastern States, where production rose 17 per cent; all zinc-producing states recorded increases in 1937.

Table 109 —Production of Zinc from Canadian Ores, by Provinces, 1928-1937

Year	Quebec		Manitoba		Saskatchewan		British Columbia		Canada	
	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value
		\$		\$		\$		\$		\$
1928.....	21,057,760	1,156,745					163,530,890	8,983,079	184,647,374	10,143,050
1929.....	19,653,440	1,058,731					172,096,841	9,270,857	197,267,087	10,626,778
1930.....	9,754,160	351,150	3,882,141	139,757			250,479,310	9,017,255	267,643,505	9,635,166
1931.....			35,173,749	898,338			202,071,702	5,160,911	237,245,451	6,059,249
1932.....			41,736,600	1,004,016			130,546,958	3,140,438	172,283,558	4,144,454
1933.....			43,516,037	1,397,082	2,789,683	89,563	152,826,264	4,906,487	199,131,984	6,393,132
1934.....			47,264,342	1,438,538	2,162,938	65,831	249,152,403	7,583,202	298,579,683	9,087,571
1935.....	5,322,844	164,955	51,129,980	1,584,513	8,974,720	278,126	255,222,315	7,909,314	320,649,859	9,936,908
1936.....	6,896,123	228,606	36,744,951	1,218,095	27,692,869	918,019	255,668,574	8,475,413	333,182,736	11,045,007
1937.....	8,566,927	419,951	36,221,314	1,775,569	32,750,910	1,605,449	287,192,877	14,078,195	370,337,589	18,153,949

Zinc-bearing ores were mined in Ontario prior to 1931; for production, see previous reports.

In 1936 Nova Scotia produced 6,180,219 pounds valued at \$204,874.

In 1937 Nova Scotia produced 5,485,550 pounds valued at \$268,902.

In 1937 Ontario produced 120,011 pounds valued at \$5,883.

Table 110 —Refined Primary Zinc, Production in Canada, 1928-1937

Year		Short tons	Year		Short tons
1928.....		81,765	1933.....		91,946
1929.....		86,048	1934.....		134,917
1930.....		121,496	1935.....		149,523
1931.....		118,622	1936.....		151,103
1932.....		86,141	1937.....		158,542

Table 111 —Imports into Canada and Exports of Zinc, 1936 and 1937

	1936		1937	
	Pounds	Value	Pounds	Value
IMPORTS—		\$		\$
Zinc dust.....	1,619,800	68,914	1,499,500	78,508
Zinc in blocks, pigs, bars and rods and zinc plates, n.o.p.....	11,400	1,238	19,400	2,805
Zinc in sheets and strips, and zinc plates for marine boilers.....	5,739,200	394,327	7,040,600	574,545
Zinc spelter.....			2,000	199
Zinc white (zinc oxide).....	13,240,889	519,425	14,481,533	742,500
Zinc sulphate.....	832,886	12,830	976,592	19,064
Zinc, chloride of.....	1,933,034	60,724	1,284,296	44,703
Zinc, manufactures of, n.o.p.....		121,863		244,349
Lithopone.....	18,859,517	666,667	22,162,600	777,752
Total.....		1,845,988		2,484,425
EXPORTS—				
Zinc, contained in ore—				
To—Belgium.....	31,584,500	553,802	65,290,500	2,612,139
Japan.....	2,455,200	37,781	234,800	2,629
United Kingdom.....				
France.....	4,535,200	126,291		
Germany.....	556,900	9,372		
United States.....	200	7	170,500	3,873
Total.....	39,132,000	727,253	65,695,800	2,618,641
Zinc, scrap, dross and ashes—				
To—United Kingdom.....	520,000	10,236	818,300	22,330
United States.....	176,300	1,661	415,400	14,356
Japan.....	2,879,800	32,435	2,581,900	41,628
Belgium.....	1,316,600	18,163	1,315,500	25,729
France.....			1,262,700	29,260
Total.....	5,007,100	63,875	6,393,800	133,303
Zinc, spelter—				
To—United Kingdom.....	226,904,300	6,918,919	178,056,700	8,388,962
United States.....	4,602,900	144,729	14,496,700	813,510
British India.....	430,800	13,224	7,031,400	334,704
Chile.....	300,100	9,460	236,900	9,079
Belgium.....	4,929,800	139,656	17,559,500	814,839
Brazil.....	795,300	23,316	392,100	19,482
China.....	5,570,800	165,728	5,704,700	303,274
France.....	1,747,500	51,979	4,070,800	156,664
Germany.....	814,900	10,254	12,962,200	648,411
Japan.....	34,351,800	1,029,521	25,398,600	1,125,542
Mexico.....	309,700	12,071	389,100	22,684
British South Africa.....	63,600	1,828	145,700	5,947
Netherlands.....			1,120,100	63,489
Siam.....			88,200	4,805
Sweden.....			672,200	26,640
Total.....	280,422,900	8,523,906	268,378,000	12,739,242
Grand Total—Exports.....	324,562,000	9,315,034	340,467,600	15,491,186

Table 112 —Monthly Average Prices of Zinc at Montreal, St. Louis and London, 1936 and 1937

Month	Zinc					
	Montreal ¹ (In cents per pound)		St. Louis ² (In cents per pound)		London ² (In £ sterling per long ton)	
	1936	1937	1936	1937	1936	1937
January.....	4.221	5.36	4.848	5.847	14.488	21.153
February.....	4.400	6.196	4.859	6.465	15.125	25.122
March.....	4.548	7.779	4.900	7.381	15.983	33.188
April.....	4.235	6.327	4.900	7.010	15.181	26.216
May.....	3.980	5.688	4.900	6.750	14.536	23.092
June.....	3.886	5.334	4.880	6.750	13.896	21.409
July.....	3.796	5.579	4.783	6.923	13.579	22.568
August.....	3.807	5.993	4.800	7.192	13.528	24.140
September.....	3.891	5.438	4.850	7.190	13.906	21.406
October.....	3.914	4.750	4.850	6.085	14.554	17.722
November.....	4.388	4.371	4.974	5.630	16.301	15.808
December.....	4.768	4.298	5.273	5.010	17.957	15.274
Average.....	4.153	5.593	4.901	6.519	14.920	23.258

The average price of zinc in Canadian funds based on the London market in 1936 was 3.31501 cents per pound and in 1937 it was 4.902 cents.

¹ Supplied by the Consolidated Mining and Smelting Co. Ltd., Montreal, Que.

² From the Engineering and Mining Journal.

Table 113 —Available Statistics on the Consumption of Zinc and Zinc Products in Specified Canadian Manufacturing Industries, 1936 and 1937

Industry	Items used	1936	1937
	METAL	Pounds	Pounds
Brass and copper products.....	Other zinc.....	345,537	271,312
	Zinc ingots and slabs.....	4,922,432	5,938,523
	Zinc scrap.....	158,239	71,137
White metal alloys.....	Zinc spelter.....	2,091,999	2,422,336
	Zinc scrap.....	590,639	951,995
Electrical apparatus.....	Zinc ingots and bars.....	723,050	880,619
	Zinc sheets.....	2,452,853	2,712,989
Acids, alkalies and salts.....	Zinc (1).....	2,999,227	4,198,278
Iron and steel.....	Zinc.....	22,205,505	26,913,053
Miscellaneous chemicals.....	Zinc sheet.....	70,587	68,947
Grand Total—Metal.....		36,560,068	44,429,189
	PRODUCTS		
Paints and pigments.....	Zinc oxide.....	2,696,741	2,619,194
	Leaded zinc oxides and zinc leads... Lithopone*.....	2,784,332 13,477,057	3,538,049 14,322,160
Electrical apparatus.....	Zinc chloride.....	356,105	423,498
Toilet preparations.....	Zinc oxide.....	64,445	61,334
	Zinc stearate.....	17,285	25,680

(1) Includes some zinc ore.

* A mixture of zinc sulphide and barium sulphate prepared by precipitation.

Table 114—World Production of Zinc Ore, 1935-1937

(In terms of metal)

(Supplied by Imperial Institute)

(Long tons)

Producing Country	1935	1936	1937	Producing Country	1935	1936	1937
BRITISH EMPIRE				FOREIGN COUNTRIES—con.			
United Kingdom.....	1,164	4,249	7,588	Roumania.....	4,002	4,147	4,490
Northern Rhodesia.....	26,902	26,155	18,844	Spain (estimated).....	33,000	30,000	20,000
Canada (shipments) (b)....	147,772	159,640	183,293	Sweden.....	31,184	33,747	35,433
Newfoundland.....	71,151	63,354	63,137	U.S.S.R. (smelter).....	45,000	65,000	(e) 70,000
Burma.....	58,200	61,300	58,600	Yugoslavia.....	60,000	52,000	48,000
Australia.....	148,492	172,414	203,456	Algeria.....	2,115	3,102	8,229
Total.....	454,000	487,000	535,000	Belgian Congo.....		377	3,009
FOREIGN COUNTRIES				French Equatorial Africa..			865
Austria.....	2,591	3,197	2,920	French Morocco.....		422	4,920
Bulgaria.....	280			Tunis.....	200	1,070	1,180
Belgium (c).....	500	2,000	3,000	Mexico.....	133,775	147,878	152,183
Czechoslovakia.....	1,549	1,342	1,919	United States.....	462,413	513,905	559,229
Finland.....	1,008	1,081	868	Argentina.....		2,916	(a)
France.....			891	Bolivia (exports).....	7,663	13,340	11,347
Germany.....	138,696	154,038	162,918	Peru.....	10,918	11,061	15,745
Greece.....	982	3,432	9,766	China (estimated).....	4,000	4,500	4,000
Italy (estimated).....	53,000	62,000	70,000	French Indo-China.....	4,966	5,139	4,880
Norway.....	6,597	7,583	8,658	Japan (c).....	20,000	18,000	20,000
Poland.....	53,000	58,000	68,000	Korea (ore).....	2,183	5,483	(a)
Portugal.....		4	9	Turkey.....	7,200	10,200	10,500
				Total.....	1,090,000	1,210,000	1,310,000
				World's Total.....	1,540,000	1,700,000	1,840,000

(a) Information not available.

(b) The amount estimated as recoverable was—

1935..... 143,147 long tons.

1936..... 148,742 “

1937..... 165,329 “

(c) Metallgesellschaft estimate.

(e) Estimated.

Table 115—World Metal Production of Zinc, 1935-1937

(Supplied by Imperial Institute)

(Long tons)

Producing Country	1935	1936	1937	Producing Country	1935	1936	1937
BRITISH EMPIRE				FOREIGN COUNTRIES—con.			
United Kingdom (b).....	63,000	65,000	62,000	Netherlands.....	13,530	15,184	24,256
Northern Rhodesia.....	20,680	20,730	14,031	Norway.....	44,308	44,317	40,624
Canada.....	133,503	134,913	141,555	Poland.....	83,270	91,118	105,481
Australia.....	67,666	70,509	69,750	Spain.....	8,775	(c) 7,700	(e) 5,200
Total.....	285,000	291,000	287,000	U.S.S.R.....	45,000	65,000	(e) 70,000
FOREIGN COUNTRIES				Yugoslavia.....	(d) 3,302	3,542	4,933
Belgium.....	178,870	198,504	214,311	Mexico.....	31,632	31,702	33,558
Czechoslovakia.....	9,511	7,549	7,220	United States (c).....	375,566	439,404	497,236
France.....	46,694	49,268	60,000	French Indo-China.....	3,842	4,047	4,139
Germany.....	121,252	131,647	160,000	Japan.....	33,651	38,449	45,000
Italy.....	26,398	26,598	37,382	Total.....	1,030,000	1,160,000	1,310,000
				World's Total.....	1,310,000	1,450,000	1,600,000

(b) Includes some secondary.

(c) The production by grades (including redistilled secondary) was as follows (long tons):—

	1935	1936	1937
A—High grade.....	138,854	164,144	175,046
B—Intermediate grade.....	43,855	53,463	59,939
C and D—Select and brass special.....	44,562	58,686	65,172
E—Prime Western.....	173,876	200,797	243,108

(d) Including zinc dust.

(e) Estimated.

Table 116—World Production of Electrolytic Zinc, 1935-1937

(Supplied by Imperial Institute)

(Long tons)

Producing Country	1935	1936	1937	Producing Country	1935	1936	1937
BRITISH EMPIRE				FOREIGN COUNTRIES—con.			
Northern Rhodesia.....	20,680	20,730	10,285	Germany.....	37,705	37,712	39,733
Canada.....	133,503	134,913	141,555	Italy.....	17,600	20,000	30,000
Australia (Tasmania).....	67,666	70,509	69,750	Norway.....	44,308	44,317	40,624
FOREIGN COUNTRIES				Poland.....	20,000	18,000	19,000
Belgium.....	1,845	6,269	7,739	United States.....	105,782	113,549	104,921
France.....	22,000	22,000	27,200	Japan (estimated).....	8,000	12,000	12,000

CHAPTER FOUR

THE NICKEL-COPPER INDUSTRY IN CANADA

1. Definition of the Industry.
2. General Review.
3. Commodity statistics, including tables showing production by provinces, imports, exports, prices and world output of nickel, copper and metals of the platinum group.

1. Definition of the Industry

The nickel-copper industry in Canada includes the mining, smelting and, to a certain extent, the refining of the nickel-copper ores of the Sudbury district in the province of Ontario. Smelting and copper refining operations are carried on in close proximity to the mines; nickel refining is conducted at Port Colborne, Ontario. Matte is exported for treatment in plants at Huntington, West Virginia, U.S.A., Kristiansand, Norway, and Clydach, Wales.

As thus described, the industry in Canada constitutes the national source of nickel, most of the platinum group metals and a large part of the Canadian copper production. Gold, silver, tellurium and selenium in increasing quantities are also recovered from these ores.

Mines in the copper-gold-silver group also contribute largely to the total Dominion copper output; ores from these properties contain, in the aggregate, about 11 per cent of the annual gold production. The activities of the copper-gold mines are reviewed in the chapter on the gold mining industry. Production and trade statistics on nickel, copper and the metals of the platinum group are given in this chapter.

General Review

Production of new nickel in Canada from all sources and in all forms totalled 224,905,046 pounds valued at \$59,507,176 during 1937. This was an increase over 1936 in output and value of 32.5 and 35.6 per cent respectively, and represents a new all time high record in the production of nickel in Canada. Practically the entire production of Canadian nickel comes from ores mined in the Sudbury district of Ontario. The nickel bearing deposits of the Sudbury area also contain relatively high values in copper and the platinum metals and the recoveries of these metals in 1937 were also the greatest ever realized in the history of the Canadian nickel-copper mining industry. The output of copper in Ontario in 1937 was estimated at 322,039,208 pounds, valued at \$41,716,364 while the combined values of platinum metals recovered during the same period from nickel-copper ores totalled \$9,931,532. Copper recovered from Ontario nickeliferous ores, in 1937, comprised approximately 61 per cent of the total Canadian copper output for the year, while the value of the platinum metals produced in the same period exceeded the combined values of all metals produced in the Yukon, Northwest Territories and Nova Scotia in 1937 and was greater than the total value of all metals produced in the entire Province of Ontario in 1899.

In addition to production of nickel, copper and the platinum metals there is an increasing output from these ores of the associated metals—silver, gold, selenium and tellurium; sulphur for the manufacture of sulphuric acid is also recovered in the gaseous state from waste smelter gases. The total gross value of the various products of the Canadian industry, considered as a whole, was estimated at \$111,353,066 in 1937 compared with a corresponding value of \$77,593,731 in the preceding year. It is also interesting to note that silver recovered from the Sudbury nickel-copper ores totalled 2,364,010 fine ounces in 1937, a recovery that was some 548,961 ounces in excess of the total silver produced in 1937 from silver-cobalt ores mined in the noted Cobalt and Gowganda camps; silver recovered from nickel-copper ores during 1937 amounted to 10.3 per cent of the total silver produced by the entire Canadian mining industry. Gold recovered from Canadian nickel-copper ores totalled 75,438 fine ounces in 1937. In 1926 the corresponding production of this metal, recorded as being recovered from this source, was only 4,447 ounces.

Two companies operate both mines and metallurgical plants in the Sudbury area. The International Nickel Company of Canada, Limited, conducts smelting operations at Copper Cliff and Coniston, Ontario, while the Falconbridge Nickel Mines, Ltd., smelts its ores at the Falconbridge mine located a few miles east of the town of Sudbury. This last named company treats

its matte in a refinery located at Kristiansand, Norway. The relatively small amount of nickel oxide produced at Deloro, Ontario, is recovered from silver-cobalt-nickel-arsenic ores mined in Northern Ontario. Smelter matte made by the International Nickel Company is treated in plants located at Clydach, Wales; Huntington, West Virginia, and at Port Colborne and Copper Cliff, Ontario. In British Columbia a relatively small tonnage of crude nickel ore was mined and exported during 1937 by the B. C. Nickel Mines, Ltd.

The number of firms reported as actually engaged in the production of nickel or in the exploration or development of nickel bearing deposits in Canada totalled 9 during 1937 as compared with 5 in 1936. Of the 1937 operations 6 were located in Ontario, 2 in British Columbia and 1 in New Brunswick. Smelting and refining operations were confined to the Province of Ontario. Capital employed in 1937 by the industry, as a whole, amounted to \$104,313,953; employees numbered 10,758; salaries and wages distributed totalled \$18,752,727 and the net value of all products of the industry was estimated at \$92,687,996 as against a corresponding value of \$63,244,633 in 1936.

The International Nickel Company of Canada Ltd., reported that, in 1937, ore requirements totalled 5,880,278 short tons of which 3,804,409 tons were extracted from the Frood mine, 1,283,046 tons from the Creighton, 399,076 tons from the Levack and 393,747 tons from the Garson. The Levack mine was re-opened in March and a new shaft at the property was being sunk to a depth of 2,000 feet; this shaft, together with a new surface plant and mine equipment, is expected to be ready for operation in 1939 for an output up to 4,000 tons per day.

As a result of a comprehensive survey it was decided by the International Nickel Company to adopt open pit mining for the upper portion of the Frood ore body and it is intended that 4,000 tons of ore per day will be available from this operation during the early months of 1939. The combination of surface mining and mining at depth will assume, it is stated, an average grade of ore over the future life of this mine. In all the mines ordinary development in 1937 was continued by the company at a rate conforming with production requirements. The total footage advance was 60,639 feet, thus bringing the total underground workings in the four operating mines to 673,120 feet or approximately 127 miles.

The concentrator of the International Nickel Company operated at capacity in 1937 and treated 4,583,100 tons of ore at a rate slightly in excess of 12,500 tons per day. The Copper Cliff smelter produced 188,169 tons of bessemer matte and 158,100 tons of converter copper. The Coniston smelter was operated at full capacity and ore to the amount of 891,956 tons was treated and 54,329 tons of bessemer matte produced. At the Port Colborne, Ontario, refinery 147,264,099 pounds of refined nickel was produced in 1937. The electrolytic copper refinery of the Ontario Refining Co. Ltd., located at Copper Cliff, processed 159,286 tons of converter copper made at the Copper Cliff smelter and produced 145,600 tons of refined copper.

In Wales at the Clydach nickel refinery (The Mond Nickel Co. Ltd.) the output of pellet nickel was 39,554,965 pounds, in addition to which 11,755,800 pounds of salts were produced, containing 2,430,130 pounds of nickel; with completion of improvements this refinery is expected to reach a production rate of 50,000,000 pounds per annum. Due to increased output of nickel at Port Colborne and Clydach the production of by-product platinum metals at the Acton (England) platinum metals refinery was 255,165 ounces, comparable with 232,343 ounces in 1936.

The total number of employees at the end of 1937 was 17,434, distributed as follows: Canada, 11,486; Great Britain, 3,421; United States, 2,472; other countries, 55. During the year the Company provided for contributory non-occupational accident and sickness insurance benefits for all its employees in Canada and the United States, whose remuneration is on an hourly basis.

Proven ore reserves at December 31, 1937, were reported by the International Nickel Company of Canada, Ltd., at 206,397,000 short tons. While the total ore reserves show an increase of 3,777,000 tons over the figures first reported in 1930 the net result is that, due to the inclusion of lower grade ores, the total ore reserves now contain 6,739,000 tons of copper nickel, comparable with 6,927,000 tons of copper nickel in the reserves as at December 31, 1929.

Falconbridge Nickel Mines Ltd. reported that all units of the plant, as completed in the expansion programme of 1936 were in continuous operation throughout 1937, with the expected increase in production being fully realized.

Of a total of 5,141 feet of drifting and cross-cutting, 3,518 feet were along the ore zone on different levels, the greater part of this footage being accounted for on the 1,200 and 1,750 levels at No. 5 shaft. No. 1 shaft was deepened 915 feet from the sump below the 1,200 level to a total

depth of 2,126 feet; at the end of the year preparations were under way to resume sinking at No. 5 shaft early in 1938. From the total ore hoisted some 12,243 tons of waste were picked and discarded; of the 438,629 tons of ore treated in 1937, 195,658 tons were milling ore and 242,971 smelting ore. Matte produced totalled 13,384.2 short tons containing 7,384.4 short tons of nickel and 3,522.8 short tons of copper. The company's refinery in Norway operated steadily and normally throughout the year with the exception of a five weeks' close down due to a strike, and the disorganization due to same; custom nickel matte containing 895.76 metric tons of nickel was received at this plant in 1937.

In addition to the new areas in the Falconbridge mine itself the company was able to bring into the ore reserves for the first time, tonnages from their holdings in other sections of the Sudbury district. Total ore reserves as of December 31, 1937, were reported at 6,332,601 tons averaging 1.82 per cent nickel and 0.89 per cent copper.

Drury Nickel Mines Ltd., formerly the Van Nickel Mines Ltd., reported early in 1938 that some 2,000 feet of diamond drilling was being conducted on its property located near Worthington in Drury township of the Sudbury district.

Diamond drilling in 1937 was also reported by the Anglo-Sudbury Nickel Corp. Ltd. This company holds mining properties in the townships of Wisner, Norman, Trill, Levack and Bowell—districts of Algoma and Sudbury. The Ontario Nickel Corp. Ltd. did not operate its smelter in 1937 and only minor surface operations were conducted on its properties; these were limited to the first six months of the year. Development operations on a nickel-copper deposit in Denison township were also reported as being conducted in 1937 by Denison Nickel Mines Ltd.

In New Brunswick, diamond drilling operations were conducted in 1937 on a nickel-copper deposit located near St. Stephen. This property is owned by the Maruba Corp. Ltd.

In British Columbia mining operations under contract were conducted during October and November, 1937, by the Western Nickel Corp. Ltd. on a nickel deposit located near Yale.

According to the British Columbia Department of Mines the development work conducted during the first six months of 1937 by the B.C. Nickel Mines Ltd. at its property near Choate, consisted of raising 177 feet, cross-cutting 83 feet, drifting 17 feet, and station-cutting 2,000 feet. All cross-cutting and drift-work served to open up a known ore-body—the Pride of Emory. During May and June about 3,500 tons of average-grade ore was produced to supply prospective nickel-concentrate buyers with a sample of the product. During the remainder of the year all underground work was discontinued and a skeleton crew maintained to keep the buildings, plant and road in condition until such time as a decision is reached for the erection of a mill.

The Bureau of Mines, Ottawa, stated in a report that important new activities in Ontario during 1937 included the incorporation of Kenora Nickel Mines Ltd., as a subsidiary of Coniagas Mines Limited, to develop the latter's nickel property at Empire Lake in the Kenora District; and the purchase, after diamond drilling, of the Cross nickel property at Shebandowan Lake, west of Port Arthur, by the International Nickel Company of Canada Limited.

Table 117.—Principal Statistics of the Nickel-Copper Mining, Smelting and Refining Industry in Canada, 1935-1937*

	1935	1936	1937
Number of firms.....	4	5	(a) 9
Number of mines.....	7	9	12
Number of smelters.....	3	4	3
Number of refineries.....	1	1	1
Capital employed..... \$	87,015,617	97,838,133	104,313,953
Number of employees—On salary.....	245	293	323
On wages.....	6,764	8,469	10,435
Total.....	7,009	8,762	10,758
Salaries and wages—Salaries..... \$	800,700	922,545	1,075,552
Wages..... \$	10,474,950	12,737,427	17,677,175
Total..... \$	11,275,650	13,659,972	18,752,727
Fuel purchased and electricity used (c)..... \$	4,735,768	5,679,676	7,454,717
Process supplies used (b)..... \$	7,181,698	8,669,422	11,210,353
Estimated gross value of matte exported and Canadian refinery products... \$	55,996,451	77,593,731	111,353,066
Value of production less items (b) and (c)..... \$	47,078,985	63,244,633	92,687,996

(*) Does not include data for copper refineries.

(a) 6 firms in Ontario, 2 in British Columbia, and 1 in New Brunswick.

Table 118.—Output from Canadian Nickel-Copper Mines and Smelters, 1933-1937

(short tons)

	1933	1934	1935	1936	1937
Ore shipped from mines.....	1,533,887	2,903,310	3,608,437	4,634,434	6,318,907
Ore and concentrates treated (x).....	1,523,814	2,896,959	3,616,223	4,620,183	6,304,517
Blister copper produced in Ontario (a).....	60,398	95,826	119,720	137,369	154,415
Nickel produced in Ontario (b).....	20,748	35,487	40,191	51,952	73,650
Matte exported (c).....	43,315	46,755	46,371	50,644	58,073
Nickel content of matte exported.....	25,811	28,771	28,949	32,766	38,063
Copper content of matte exported.....	12,323	6,692	6,272	6,496	6,497

(x) Represents the tonnage of crude ore smelted together with the tonnage of ore milled; also in addition to the totals recorded for 1936 and 1937 a relatively small tonnage of nickel-bearing ore was exported from a property located in British Columbia.

(a) Copper content.

(b) Includes nickel content of salts and oxides produced.

(c) Less a relatively small tonnage of matte returned annually to Canada since 1934 for re-treatment.

Table 119.—Employees, Salaries and Wages, in the Nickel-Copper Mining, Smelting and Refining Industry in Canada, 1937

	1937						
	On salary		Mine		Mill	Total	Salaries and wages
			Surface	Under-ground			
	Male	Female					\$
Salaried employees—							
Mine and mill.....	80	5				85	270,565
Smelters and refinery.....	189	49				238	804,987
Total	269	54				323	1,075,552
Wage-earners—							
Mine and mill.....			938	4,169	270	5,377	9,922,926
Smelters and refinery.....			5,058			5,058	7,754,249
Total			5,996	4,169	270	10,435	17,677,175
Grand Total	269	54	5,996	4,169	270	10,758	18,752,727

Table 120.—Number of Wage-Earners Employed, by Months, 1935-1937

Month	1935	1936	1937	Month	1935	1936	1937
January.....	5,666	8,076	9,302	July.....	6,733	8,653	11,009
February.....	5,804	8,044	9,572	August.....	7,253	8,804	11,036
March.....	6,077	8,103	9,840	September.....	7,500	8,606	11,048
April.....	6,277	8,191	10,118	October.....	7,714	8,700	10,760
May.....	6,446	8,287	10,458	November.....	7,632	8,735	10,695
June.....	6,573	8,411	10,762	December.....	7,489	9,050	10,578

NICKEL

Production figures include nickel in matte or speiss exported from the Canadian smelters valued at 18 cents per pound; refined and electrolytic nickel produced in Canada, valued at the average price received for sales of nickel metal from the refinery during the year, and the nickel equivalent in oxides or salts produced, valued in the aggregate at the price obtained from the sales of oxides or salts.

Table 121.—Production of Nickel from Canadian Ores, 1928-1937

Year	Pounds of nickel	Value	Year	Pounds of nickel	Value
		\$			\$
1928.....	96,755,578	22,318,907	1933.....	83,264,658	20,130,480
1929.....	110,275,912	27,115,461	1934.....	128,687,340	32,139,425
1930.....	103,768,857	24,455,123	1935.....	138,516,240	35,345,103
1931.....	65,666,320	15,267,453	1936.....	169,739,393	43,876,525
1932.....	30,327,968	7,179,862	1937.....	224,905,046	59,507,176

Table 122.—Production in Canada, Imports and Exports of Nickel, 1936 and 1937

	1936		1937	
	Quantity	Value	Quantity	Value
	Lb.	\$	Lb.	\$
PRODUCTION—				
Nickel in matte, speiss, residues, etc., exported.....	169,739,393	43,876,525	224,905,046	59,507,176
Refined and electrolytic nickel produced in Canada.....				
Nickel in oxides and salts sold or produced.....				
IMPORTS—				
Nickel, nickel silver and German silver in ingots or block, n.o.p.....	10,008	2,603	20,061	5,636
Nickel in bars and rods, strips, sheets and plates.....	769,061	300,141	818,946	326,469
Nickel silver and German silver in bars, rods, strips, sheets, plates or anodes.....	101,585	27,920	97,327	25,785
Nickel chromium in bars or rods, etc.....	52,825	51,170	46,246	45,264
German, Nevada and nickel silver, manufactures of, not plated.....		126,081		178,572
Nickel-plated household hollow-ware.....		2,212		2,115
Nickel kitchenware.....		1,473		1,344
Nickel-plated ware, n.o.p.....		665,649		887,535
Total Nickel and its Products.....		1,177,249		1,472,720
EXPORTS—				
Total (metal in all forms).....	173,637,500	44,594,296	222,770,000	58,913,217

Table 123.—World Production of Nickel Ore, 1935-1937

(Supplied by Imperial Institute)

(In terms of metal)

(Long tons)

Producing country	1935	1936	1937	Producing country	1935	1936	1937
BRITISH EMPIRE				FOREIGN COUNTRIES—Con.			
Southern Rhodesia (estimated).....	12	14	2	Norway.....	1,216	1,251	863
Canada.....	61,838	75,777	100,404	U.S.S.R.....	1,800	(a)	(a)
Burma (b).....	1,465	1,292	1,214	Egypt.....			14
Total.....	63,300	77,100	101,600	Morocco (French).....	205	146	250
FOREIGN COUNTRIES				United States (d).....	143	96	196
Germany.....	268	(a)	(a)	Brazil.....	5	470	102
Greece (e).....	1,091	1,235	(a)	New Caledonia (e).....	8,100	4,820	6,600
				Total.....	12,800	10,000	11,500
				World's Total.....	76,100	87,000	113,000

(a) Information not available.

(b) Nickel content of speiss obtained as a by-product in smelting operations.

(c) Estimated content of matte and ferro-nickel obtained at smelters was as follows:—

1935.....	6,000 long tons
1936.....	4,650 "

(d) Nickel content of salts and nickel produced as a by-product in the electrolytic refining of copper (partly from imported blister copper).

Secondary metal was recovered in the United States as follows:—

1935.....	1,750 long tons
1936.....	1,754 "
1937.....	2,143 "

(e) Figures represent combined totals of nickel content and cobalt content of ores.

NICKEL CONTAINED IN PRINCIPAL NICKEL ALLOYS

(Supplied by the International Nickel Company of Canada, Limited)

As guide to the part which nickel has in the industrial world through the alloys now being used in industry, the nickel content of the best known alloys is shown in the following table:—

Non-Ferrous Alloys—	Per cent Nickel
Malleable Nickel.....	99
Monel Metal.....	67
Inconel.....	80
Heat Resistant Alloys (including Ferrous).....	35-85
Cupro-Nickel Alloys.....	15-50
Nickel Silvers.....	10-30
Nickel Brasses and Bronzes.....	$\frac{1}{2}$ -5
FERROUS ALLOYS—	
Nickel Steels.....	$\frac{1}{2}$ -7
Stainless Steels (Nickel-Chromium).....	7-35
Non-Magnetic Steels.....	10-25
Invar Type Steels.....	32-45
Nickel Wrought Iron.....	3
Nickel Cast Irons.....	$\frac{1}{2}$ -5
Ni-Resist Types.....	14-20
Ni-Hard.....	4-6
Ni-Tensyliron.....	1-2 $\frac{1}{2}$

The heat resisting alloys are practically all of a nickel-chromium-iron combination with small additions of other elements which impart special characteristics depending upon the type of application. There is a large number of these alloys, in which the nickel ranges from 10 to 80 per cent, which may be divided into the following types:—

Type	Nickel	Chromium
1.....	60-80	15-20
2.....	25-40	15-20
3.....	20-25	20-30
4.....	10-20	20-30

The transportation industry is still the largest consumer of nickel alloy steel. There is a definite trend toward the use of nickel alloy steels for railroads, in ships, for road building and excavating equipment and in large power machinery, machine tools and agricultural equipment. The use of stainless steel throughout the world has increased steadily; an outstanding application of stainless steel for building light weight stream-line railroad equipment has grown and the use of stainless steel has also spread to the construction of airplanes.

During 1937 there were 360 long tons of nickel metal valued at \$245,608 consumed in Canada in the manufacture of alloy steels.

Table 124.—World Nickel Consumption, 1937

(International Nickel Company of Canada, Limited)

	Per cent
Steels (construction steels, stainless steels and other corrosion and heat resisting steels, and steel castings)...	55
Nickel cast iron.....	5
Nickel-iron alloys.....	1
Nickel-copper alloys and nickel silvers.....	10
Nickel, brass, bronze and aluminium alloy castings.....	2
Heat resistant and electrical resistance alloys.....	3
"Monel", malleable nickel, nickel-clad, "Inconel".....	12
Electrodeposition.....	10
Non-metallic materials for the chemical industry (nickel salts, ceramic materials, storage battery materials and catalysts).....	1
Miscellaneous and unclassified.....	1

COPPER

Canadian copper production, including the copper in blister copper and anode copper produced at Canadian smelters, together with the copper contained in ores, matte and concentrates exported, totalled 530,028,615 pounds valued at \$68,917,219 in 1937. Copper production in 1937 established a new all-time high record in both quantity and value of output. During the year under review copper bearing ores were mined in Nova Scotia, Quebec, Ontario, Manitoba, Saskatchewan, British Columbia and Northwest Territories. Of the total Canadian copper output in 1937 the nickel-copper ores of the Sudbury district in Ontario contributed 321,823,216 pounds or 61 per cent. World mine production of copper in 1937 totalled 2,300,000 long tons compared with 1,700,000 long tons in 1936: of the 1937 output the British Empire produced 570,000 long tons and of this the Canadian output comprised 236,620 long tons. Canada stood fourth among the world producer's of copper in 1937 being surpassed in order of output by the United States, Chile and Northern Rhodesia. Transposed into Canadian funds the average price of copper, based on the London Market, was 13.078 cents per pound in 1937 compared with 9.477 cents per pound in 1936.

Table 125.—Production of Copper from Canadian Ores, 1928-1937

Year	Pounds	Value	Year	Pounds	Value
		\$			\$
1928.....	202,696,046	28,598,249	1933.....	299,982,448	21,634,853
1929.....	248,120,760	43,415,251	1934.....	364,761,062	26,671,438
1930.....	303,478,356	37,948,359	1935.....	418,997,700	32,311,960
1931.....	292,304,390	24,114,065	1936.....	421,027,732	39,514,101
1932.....	247,679,070	15,294,058	1937.....	530,028,615	68,917,219

Table 126.—Production of Copper in Canada, by Provinces and Sources, 1936 and 1937

	1936		1937	
	Pounds	Value	Pounds	Value
		\$		\$
PRODUCTION—				
By Provinces—				
Nova Scotia.....	779,307	73,855	180,609	23,620
Quebec.....	66,340,175	6,287,058	94,653,132	12,378,737
Ontario.....	287,914,078	26,898,920	322,039,208	41,716,364
Manitoba.....	29,853,220	2,829,190	44,920,835	5,874,747
Saskatchewan.....	14,971,609	1,418,859	22,436,843	2,934,290
British Columbia (x).....	21,169,343	2,006,219	45,797,988	5,989,461
Total.....	421,027,732	39,514,101	530,028,615	68,917,219
By Sources—				
In blister and anode copper produced.....	382,310,369	36,231,553	463,025,584	60,554,486
In ores, concentrates and copper matte exported.....	24,823,203	2,352,495	(a) 54,010,039	7,063,434
In nickel-copper matte exported.....	13,894,160	930,053	12,992,992	1,299,299
Total.....	421,027,732	39,514,101	530,028,615	68,917,219

(x) Includes a small production from the Northwest Territories in 1936.

(a) Includes a relatively small quantity of copper contained in gold and silver ores shipped to Canadian smelters.

Table 127.—Production of Refined Copper in Canada, 1928-1937

Year	Tons	Year	Tons
1928.....	8,806	1933.....	112,245
1929.....	3,518	1934.....	149,261
1930.....	31,377	1935.....	173,290
1931.....	92,183	1936.....	191,595
1932.....	90,077	1937.....	215,080

The annual capacity of Canadian electrolytic copper refineries in 1937 was 201,000 short tons of refined copper (Ontario Refining Co. Ltd. 120,000 tons; Canadian Copper Refiners Ltd., 81,000 tons).

Table 128.—Quantity and Value of Copper Produced in Canada, by Provinces, 1928-1937

Year	Quebec		Ontario	
	lb.	\$	lb.	\$
1928.....	33,697,949	4,909,791	66,607,510	8,770,149
1929.....	55,337,169	10,019,901	88,879,853	14,622,572
1930.....	80,310,363	10,425,891	127,718,871	15,187,259
1931.....	68,376,985	5,723,154	112,882,625	9,096,463
1932.....	67,336,692	4,296,216	77,055,413	4,407,928
1933.....	69,943,882	5,214,177	145,504,720	10,118,847
1934.....	73,968,545	5,487,948	205,059,539	14,822,704
1935.....	79,050,906	6,162,350	252,027,923	19,295,965
1936.....	66,340,175	6,287,053	287,914,078	26,898,920
1937.....	94,653,132	12,378,737	322,039,208	41,716,364

Year	Manitoba		Saskatchewan†	
	lb.	\$	lb.	\$
1928.....				
1929.....				
1930.....	2,087,609	215,018		
1931.....	45,821,432	3,835,254		
1932.....	52,706,861	3,362,803		
1933.....	38,163,181	2,844,989	3,223,941	240,338
1934.....	30,867,141	2,290,126	6,618,913	491,077
1935.....	38,011,371	2,963,146	11,429,452	890,974
1936.....	29,853,220	2,329,190	14,971,609	1,418,859
1937.....	44,920,835	5,874,747	22,436,843	2,934,290

Year	British Columbia		Yukon	
	lb.	\$	lb.	\$
1928.....	102,283,210	14,902,664	*107,377	15,645
1929.....	103,903,738	18,772,778		
1930.....	93,318,885	12,114,657	42,628	5,534
1931.....	65,223,348	5,459,194		
1932.....	50,580,104	3,227,111		
1933.....	43,146,724	3,216,502		
1934.....	48,246,924	3,579,583		
1935.....	38,478,043	2,999,525		
1936.....	21,169,343	2,006,219		
1937.....	45,797,988	5,989,461		

*Includes small quantities produced in 1925, 1926 and 1927, but not reported until 1928.

†The metal is recovered from that part of the Flin Flon mine situated on the Saskatchewan side of the Manitoba-Saskatchewan border.

NOTE.—Not included in the above table were 779,307 pounds of copper valued at \$73,855 produced in Nova Scotia in 1936 and 180,609 pounds valued at \$23,620 in 1937. In addition relatively small quantities of copper are contained in concentrates made from pitchblende-silver ores mined in the Northwest Territories.

Table 129 —Available Statistics on the Consumption of Copper in Specified Canadian Industries, 1936 and 1937

Industry	Item (Used)	1936	1937
Brass and Copper Products (a)	Ingots, wire bars, slabs, etc..... lb.	99,560,824	110,573,509
	Scrap..... lb.	5,574,612	4,864,385
	Rods..... lb.	42,556	13,004
	Pipe and tubing..... lb.	39,888	98,254
	Plates and sheets..... lb.	640,597	889,449
	Wire..... lb.	196,768	323,266
	Castings..... lb.	4,679	5,324
White Metal Alloys	Other..... lb.	71,062	97,103
	Scrap..... lb.	1,831,095	2,029,900
	Copper bars, sheets, etc..... lb.	57,378	51,253
Electrical Apparatus and Supplies	Castings..... lb.		165,963
	Ingots, slabs, wire bars, etc..... lb.	99,137	806,281
	Rods..... lb.	25,702,675	34,367,135
	Scrap..... lb.	51,964	170,463
	Tubing and pipe..... lb.	655,102	427,010
	Sheets and plates..... lb.	304,733	570,893
	Wire, bare..... lb.	3,956,581	5,357,119
Iron and Steel and Their Products	Wire, enamelled..... \$	369,796	546,076
	Wire, other insulated..... \$	637,391	954,553
	Copper sheets, bars, etc..... lb.	7,609,363	7,696,884

(a) A relatively large part of the copper included under this industry is rolled into wire rods, which are sold to manufacturers of electrical cable; duplication to this extent results from the inclusion of these rods in the electrical apparatus industry.

Table 130 —Imports into Canada and Exports of Copper, 1936 and 1937

	1936		1937	
	Pounds	Value	Pounds	Value
		\$		\$
IMPORTS—				
Copper in bars or rods, when imported by manufacturers of trolley, telegraph and telephone wires and electric cables for use only in the manufacture of such articles in their own factories.....	742,400	93,489	1,048,800	158,528
Copper bars for use only in the manufacture of rods to be used exclusively in the manufacture of electrical conductors, and copper rods for such manufacture, individual units of conductors not to exceed area of No. 7-0 gauge conductor.....	18,700	1,858	7,400	825
Copper in bars or rods, in lengths of not less than 6 feet, unmanufactured.....	165,500	30,723	333,500	61,180
Copper in blocks, pigs or ingots.....	189,300	19,858	15,500	1,941
Copper, scrap, cathode plates, etc.....	7,000	316	4,600	455
Copper in strips, sheets or plates not polished or coated.....	378,700	71,262	707,300	155,463
Copper tubing in lengths of not less than 6 feet, and not polished, bent or otherwise manufactured.....	431,244	106,253	675,896	193,637
Copper wire, n.o.p.....	21,055	5,017	37,576	6,831
Copper wire cloth, or woven wire of copper.....		6,263		7,523
Copper, manufactures of, n.o.p.....		388,399		536,135
Copper, precipitate of, crude.....			246	33
Anodes of nickel, zinc, copper, silver or gold.....		6,384		7,098
Copper, sub-acetate of, or verdigris, dry.....	7,015	1,212		
Copper, sulphate of (blue vitriol).....	4,542,122	149,889	5,665,495	238,636
Copper rollers adapted for use in calico printing.....		78,621		124,315
Copper, sulphate of, dehydrated, for agricultural or spraying purposes.....	7,000	583		
Total.....		960,127		1,492,600
EXPORTS—				
Copper, fine, contained in ore, matte, regulus, etc.....	45,519,600	2,971,042	73,867,600	7,409,381
Copper, blister.....			10,884,300	1,333,073
Copper, old and scrap.....	8,108,700	535,753	5,551,000	549,638
Copper in ingots, bars, cakes, slabs and billets.....	310,860,400	27,460,714	296,141,300	38,705,380
Copper in rods, strips, sheets, plates, and tubing.....	48,152,900	4,769,923	51,224,800	7,310,329
Copper wire and cable, insulated.....		469,789		436,834
Copper manufactures, n.o.p.....		294,433		410,647
Total.....		36,501,654		56,155,282
Copper coin, foreign.....		3,048		2,382
Copper coin, Canadian.....		570		113
Brass and its products.....		1,018,932		1,614,953

Table 131 —Copper Prices by Months, 1936 and 1937

Month	Copper (Electrolytic)					
	New York (in cents per pound)		London (In £ sterling per long ton)		Montreal (In cents per pound)	
	1936	1937	1936	1937	1936	1937
January.....	9-025	12-415	38-788	56-497	4-362	6-670
February.....	9-025	13-427	39-463	64-013	4-516	6-793
March.....	9-025	15-775	40-227	76-167	4-614	7-690
April.....	9-169	15-121	41-131	66-614	4-368	6-248
May.....	9-275	13-775	40-839	63-684	4-130	5-843
June.....	9-275	13-775	40-357	61-409	4-093	5-632
July.....	9-352	13-775	41-228	62-807	4-213	5-882
August.....	9-525	13-775	42-375	63-595	4-412	5-705
September.....	9-525	13-530	43-267	58-966	4-695	5-317
October.....	9-563	11-838	45-295	50-619	4-676	4-825
November.....	10-161	10-797	48-467	44-023	5-384	4-576
December.....	10-763	10-006	50-364	43-886	6-246	4-402
Average.....	9-474	13-167	42-650	59-339	4-642	5-799

Transposed into Canadian funds the average price of copper, based on the London market, was 9-47695 cents per pound in 1936 and 13-078 cents in 1937.

Table 132 — Canadian Copper Ore Reserves as Officially Reported

(American Bureau of Metal Statistics)

	Year	Province	Short tons ore	Average grade	Short tons copper
Falconbridge (a).....	1937	Ontario.....	6,332,601	%	56,400
Granby Consolidated—Allenby.....	1937	British Columbia...	10,634,906	1.60	170,200
Hudson Bay.....	1935	Manitoba.....	24,770,000	2.10	520,200
International Nickel (a).....	1937	Ontario.....	206,397,000	.....	(b) 6,739,000
Noranda.....	1937	Quebec.....	30,901,000	2.53	782,500
Normetal.....	1935	Quebec.....	782,600	2.13	16,700
Sherritt Gordon.....	1937	Manitoba.....	3,755,000	2.68	100,600
Waite-Amulet.....	1937	Quebec.....	908,385	4.26	38,700
Britannia.....	.....	British Columbia...	(c)	(c)	(c)
Consolidated Copper and Sulphur.....	.....	Quebec.....	(c)	(c)	(c)
Aldermac Mines Ltd.....	1937	Quebec.....	2,082,000	2.00	41,600

(a) Also produces nickel.

(b) Copper-nickel content.

(c) Data not available.

Table 133 — World Production of Copper Ore, 1935-1937

(Imperial Institute)

(In terms of metal)

(Long tons)

Producing Country	1935	1936	1937	Producing Country	1935	1936	1937
BRITISH EMPIRE				FOREIGN COUNTRIES—con.			
United Kingdom.....	50	62	36	Italy (estimated).....	330	410	600
Northern Rhodesia.....	168,659	170,728	245,888	Norway.....	20,190	22,249	19,760
Southern Rhodesia.....	.....	10	.....	Portugal.....	(b) 2,000	(b) 2,000	5,518
South West Africa (c).....	.....	.....	11,600	Roumania.....	210	250	200
Union of South Africa.....	10,629	8,925	11,209	Spain (estimated).....	30,000	25,000	27,000
Canada.....	187,053	187,959	286,620	Sweden.....	6,287	7,975	7,061
Newfoundland.....	2,910	5,258	8,326	U.S.S.R.....	62,250	82,000	90,000
Burma (estimated).....	4,200	4,000	3,700	Yugoslavia.....	41,000	41,000	44,000
Cyprus (estimated).....	12,232	16,351	27,027	Algeria.....	12	197	.....
Federated Malay States.....	8,700	8,900	10,800	Belgian Congo (smelter).....	105,981	94,156	148,210
India (estimated).....	16,990	18,561	19,127	Cuba.....	6,850	11,447	12,983
Australia.....	.....	.....	.....	Mexico (d).....	38,751	29,244	45,350
Total.....	410,000	420,000	570,000	United States (d).....	339,723	548,674	748,009
FOREIGN COUNTRIES				Bolivia (exports).....	1,853	3,198	3,641
Austria.....	54	12	12	Chile (d).....	262,864	252,162	410,000
Bulgaria.....	146	.....	20	Panama.....	39	22	.....
Czechoslovakia (e).....	240	341	698	Peru.....	30,237	32,825	36,000
Finland.....	11,380	11,760	12,604	Formosa (estimated).....	4,000	4,000	(a)
France.....	586	523	582	Japan (smelter).....	68,215	76,505	86,215
Germany.....	26,987	26,481	29,769	Korea.....	2,200	3,600	(a)
Greece.....	65	.....	300	Turkey.....	.....	.....	400
Hungary.....	240	119	(a)	Total.....	1,060,000	1,280,000	1,730,000
				World's Total.....	1,470,000	1,700,000	2,300,000

(a) Information not available.

(b) Estimated.

(c) Year ended March 31 following.

(d) Amount estimated as recoverable.

(e) Copper content of iron ore.

Table 134 — World Metal Production of Copper, 1935-1937

(Supplied by Imperial Institute)

(Long tons)

Producing Country	1935	1936	1937	Producing Country	1935	1936	1937
BRITISH EMPIRE				FOREIGN COUNTRIES—con.			
United Kingdom (b).....	12,400	9,300	7,400	Italy.....	(d) 354	462	1,446
Northern Rhodesia.....	143,501	142,333	208,172	Norway.....	8,305	8,233	8,171
Union of South Africa.....	11,449	9,865	13,092	Spain.....	11,379	(e) 10,000	(e) 10,000
Canada (c).....	172,697	170,674	206,709	Sweden.....	8,677	10,082	9,940
India.....	6,900	7,200	6,830	U.S.S.R.....	62,250	82,000	90,000
Australia.....	11,168	13,313	17,400	Yugoslavia.....	38,384	38,778	38,788
Total.....	358,000	353,000	460,000	Belgian Congo.....	105,981	94,156	148,210
FOREIGN COUNTRIES				Mexico.....	37,592	27,942	(e) 45,000
Austria.....	1,316	1,771	2,041	United States.....	372,646	583,285	807,377
Belgium.....	80,429	57,842	88,834	Chile.....	255,825	241,409	406,659
Czechoslovakia.....	926	1,086	1,981	Peru.....	29,607	32,030	35,100
Finland.....	.....	6,531	10,428	Japan.....	68,215	76,505	86,215
France.....	42	1,083	1,027	Korea.....	2,135	3,579	(a)
Germany (f).....	55,700	60,600	64,500	Total.....	1,140,000	1,340,000	1,860,000
				World's Total.....	1,500,000	1,690,000	2,320,000

(a) Information not available.

(b) Includes some copper going direct into sulphate production.

(c) Copper content of blister copper.

(d) 7,889 long tons of secondary copper were also produced.

(e) Estimated.

(f) Metallgesellschaft figures.

METALS OF THE PLATINUM GROUP

Production of the platinum group metals in Canada during 1937 totalled 259,206 fine ounces valued at \$9,932,598. With the exception of 22 ounces recovered from alluvial deposits in British Columbia, the entire output of these metals in the Dominion represents recoveries made from the nickel-copper ores of the Sudbury district in Ontario. Of the total output in 1937 platinum comprised 139,377 fine ounces and palladium, rhodium, iridium, etc., 119,829 fine ounces. Canada is now the world's largest producer of platinum metals. Russia and Colombia are the world's other most important platinum producers with the output in troy ounces of crude platinum in these countries during 1937 totalling 100,000 and 29,315 ounces, respectively. The average London price of platinum in 1937 was £9·811 per fine ounce as compared with £8·138 in 1936.

The platinum metals contained in matte produced from the Sudbury ores by the International Nickel Company of Canada, Limited, are refined at Acton, England, and the platinum metals contained in matte produced in the Sudbury area by the Falconbridge Mines Limited are recovered in the refinery of this company which is located at Kristiansand, Norway.

In 1937 the jewellery trade remained a large user of platinum, but greater progress was made with platinum metals generally in the chemical, electrical, and dental industries. There has been an increased use of platinum and palladium for electrical contacts, and of platinum and rhodium for dies for extruding glass fibres. Platinum and platinum-rhodium catalysts, used in the synthesis of sulphuric acid and of nitric acid, have also been in greater use. Rhodium plating for silverware and other metals has improved markedly, and iridium and palladium gained favour in jewellery manufacture. The use of palladium leaf as a decorative material in architecture, bookbinding and sign work is steadily expanding.

Table 135 —Production of Platinum Group Metals in Canada, 1935, 1936 and 1937

	Platinum		Palladium, Rhodium, Iridium, etc.	
	Fine ounces	\$	Fine ounces	\$
1935				
Ontario.....	105,335	3,444,455	84,772	1,962,937
British Columbia.....	39	1,275		
Total.....	105,374	3,445,730	84,772	1,962,937
1936				
Ontario.....	131,551	5,319,922	103,671	2,483,075
British Columbia.....	20	809		
Total.....	131,571	5,320,731	103,671	2,483,075
1937				
Ontario.....	139,355	6,751,750	119,829	3,179,782
British Columbia.....	22	1,066		
Total.....	139,377	6,752,816	119,829	3,179,782

Table 136 —Production of Metals of the Platinum Group, 1928-1937

Year	Platinum				Palladium*	
	Lode		Placer		Fine oz.	\$
	Fine oz.	\$	Fine oz.	\$		
1928.....	10,483	706,090	49	2,819	11,909	511,998
1929.....	12,491	845,057	28	1,699	12,408	471,614
1930.....	34,007	1,542,490	17	771	29,959	689,217
1931.....	44,725	1,595,117	50	1,783	39,313	780,260
1932.....	27,284	1,097,021	59	2,372	29,727	548,582
1933.....	24,746	856,190	40	1,400	31,009	645,043
1934.....	116,177	4,488,712	53	2,051	83,932	1,699,228
1935.....	105,335	3,444,455	39	1,275	84,772	1,962,937
1936.....	131,551	5,319,922	20	809	103,671	2,483,075
1937.....	139,355	6,751,750	22	1,066	119,829	3,179,782

*Since 1933 includes other platinum metals except platinum.

Table 137 —Production of Certain Metals of the Platinum Group, 1926-1932*

Year	Rhodium		Ruthenium		Osmium		Iridium	
	Fine oz.	\$	Fine oz.	\$	Fine oz.	\$	Fine oz.	\$
1926.....	204	9,969	16	791			14	3,252
1927.....	222	6,853	31	1,073			45	4,945
1928.....	895	20,951	561	16,331			342	78,553
1929.....	3,037	151,850	1,376	66,048			497	119,777
1930.....	(a) 4,133	206,650						
1931.....	(a) 7,605	431,457						
1932.....	(a) 7,886	353,308						

(a) Includes rhodium, iridium and ruthenium as other platinum metals.

*Since 1933 these metals are included with palladium as shown in preceding table.

Table 138 —Imports into Canada and Exports of Platinum, 1936 and 1937

	1936		1937	
	Oz.	Value	Oz.	Value
IMPORTS—		\$		\$
Platinum retorts, pans, condensers, tubing and pipe.....		23,788		7,602
Platinum wire and bars, strips, sheets or plates, also platinum, palladium, iridium, osmium, ruthenium and rhodium in lumps, ingots, powder, sponge or scrap.....		140,868		295,646
Platinum crucibles.....		6,489		6,800
Total.....		171,145		310,048
EXPORTS—				
Platinum, and metals of the platinum group contained in concentrates.....		6,841,940		8,374,795
Platinum, old and scrap.....	317	10,657	671	27,760
Total.....		6,852,597		8,402,555

Table 139 —Platinum Consumed in Canadian Jewellery and Silverware Industry, 1932-1937

Year	Value	Year	Value
	\$		\$
1932.....	26,928	1935.....	45,627
1933.....	35,714	1936.....	101,129
1934.....	38,307	1937.....	112,295

Table 140 —Platinum Metals Sold in the United States, as Reported by Refiners and Shown by Consuming Industries, 1936

(From *Minerals Year Book*, U.S. Bureau of Mines.)

(In Troy ounces)

Industry	Platinum	Palladium	Iridium	Others	Total	Percentage of total
1936						
Chemical.....	20,984	124	131	256	21,495	13
Electrical.....	8,750	13,297	894	367	23,308	14
Dental.....	15,489	25,481	148	26	41,144	25
Jewellery.....	50,936	5,778	3,100	1,066	60,880	37
Miscellaneous and undistributed.....	16,288	859	117	756	18,020	11
Total.....	112,447	45,539	4,390	2,471	164,847	100

Table 141 —World Production of Platinum Metals, 1935-1937

(Supplied by Imperial Institute)

(Troy ounces)

Producing Country	1935	1936	1937	Producing Country	1935	1936	1937
BRITISH EMPIRE				FOREIGN COUNTRIES			
Sierra Leone—				U.S.S.R.—			
Crude platinum.....	750	484	308	Crude petroleum (estimated).....	100,000	100,000	100,000
Union of South Africa—				Abyssinia (b)—			
Crude (Pt. metals content).....	19,954	19,751	17,776	Crude platinum.....	5,350	8,038	(a)
Concentrates (Pt. metals content).....	11,318	13,164	21,849	Belgian Congo—			
Osmiridium (crude) (c)...	5,047	5,431	5,790	Palladium.....	5,144	12,571	12,506
Canada—				Platinum.....	965	3,183	2,122
Crude platinum (Pt. content).....	39	20	22	United States—			
Recovered from Ontario nickel-copper matte—				Crude platinum.....	9,069	9,785	9,997
Platinum.....	105,335	131,551	139,355	Ore (Pt. metals content).....		110	124
Other platinum metals.....	84,772	103,671	119,829	New platinum metals recovered by refineries from gold and copper ores of domestic origin—			
New South Wales—				Platinum.....	1,361	4,443	4,761
Crude platinum.....	98	47	46	Palladium.....	1,115	4,505	5,776
Tasmania—				Iridium, osmiridium, etc.....	7	36	41
Osmiridium (crude).....	235	281	586	Colombia—			
New Zealand—				Crude platinum.....	38,628	38,333	29,315
Crude platinum.....	14	29	55	Panama—			
Papua—				Crude platinum.....	16	19	267
Crude platinum..... (d)	46	24	20	Japan—			
Osmiridium (crude)..... (d)	9		8	Crude platinum.....	51	34	(a)
				Palladium.....	11	(a)	(a)
				Iridium.....	2	(a)	(a)

(a) Information not available.

(b) Amount registered, which is probably not total production.

(c) It is estimated by the Department of Mines, Union of South Africa, that the osmiridium sold during these years contained the following amounts of the metals mentioned below (fine ounces):—

	1935	1936	1937
Osmium.....	1,731	1,670	1,695
Iridium.....	1,501	1,432	1,493
Ruthenium.....	694	730	764
Platinum.....	594	641	639
Rhodium.....	29	25	27

(d) Year ended June 30.

Secondary platinum metals recovered in the United States were as follows (troy ounces):—

	1935	1936	1937
Platinum.....	47,107	55,959	55,926
Palladium.....	7,852	6,786	12,680
Iridium.....	2,191	2,204	2,320
Other platinum metals.....	1,975	1,217	1,280

CHAPTER FIVE

MISCELLANEOUS METAL MINING INDUSTRIES IN CANADA

Including General Statistics Relating to the Industries in this Group and Commodity Statistics Showing Production by Provinces, Imports, Exports, Prices and World Output Tables on Aluminium, Antimony, Barium, Beryllium, Cadmium, Calcium, Chromite, Iron Ore, Pig Iron and Ferro-Alloys, Steel and Rolled Products, Lithium, Magnesium, Manganese, Mercury, Molybdenum, Radium, Selenium, Tantalum, Tellurium, Tin, Titanium, Tungsten, Uranium, Vanadium and Zirconium.

1. General Review

Metal-bearing minerals, mined in relatively small quantities by a comparatively few operators, have been grouped by the Dominion Bureau of Statistics for consideration as a single industry. Included with the finally revised statistics relating to the Canadian production of these, are notes and statistical data pertaining to various rare or semi-rare metals or metalliferous ores produced in other countries. Metals or metal-bearing ores produced in Canada during 1937 and classified as miscellaneous include—antimony, bismuth, cadmium, chromite, manganese ore, molybdenite, radium and uranium products, selenium, tellurium and titanium ore. In addition to particulars relating to these metals or products, the chapter contains notes of a summary nature on beryl and beryllium, lithium, magnesium, sodium, tungsten, calcium, aluminium, tin, iron ores, vanadium, mercury, and zirconium.

It is to be noted that the majority of the metals listed above as Canadian products and including bismuth, cadmium, selenium and tellurium, represent by-products recovered in the refining of lead, zinc or copper and, for this reason, such statistics as relate to their production in Canada are included with those of either the silver-lead-zinc mining industry, the copper-gold-silver mining industry, or the non-ferrous smelting and refining industry.

For historical purposes and to provide the interested reader with available data, tables have been prepared for this chapter that set out the known facts regarding domestic and world production of these metals or ores.

2. Commodity Statistics on Aluminium, Antimony, Beryllium, Bismuth, Cadmium, Calcium, Chromite, Iron Ore, Pig-Iron, Ferro-Alloys, Steel and Rolled Products, Lithium, Manganese, Mercury, Molybdenum, Radium-uranium, Selenium, Tellurium, Tin, Tantalum, Titanium, Tungsten, Vanadium, Zirconium

ALUMINIUM

The reduction of aluminium ores and the production of primary aluminium in Canada are confined to the province of Quebec. In this province the Aluminum Company of Canada, Limited, operates an ore treatment plant at Arvida and reduction plants at both Arvida and Shawinigan Falls. These three plants were in continuous operation throughout 1937. At the Arvida ore plant concentrates were made from British Guiana bauxite and aluminium ingot was produced in the two reduction works. The company also operates fabricating plants at Shawinigan Falls, Quebec, and Toronto, Ontario. Bauxite from British Guiana, used for the production of aluminium, is washed and dried before being shipped; at Arvida, Quebec, it is treated by a standard chemical process to remove impurities, and pure aluminium oxide is recovered. Cryolite, necessary in the production of the metal, is imported from Greenland. A very large amount of electrical energy is utilized in the production of new aluminium metal from bauxite concentrates. No bauxite ores are mined in Canada and the principal bauxite producing countries are—France, Hungary, United States, Surinam, Yugoslavia, Italy, British Guiana, Netherland India, and Russia.

World production of aluminium in 1937, as reported by the American Bureau of Metal Statistics, totalled approximately 489,609 metric tons compared with 366,773 metric tons in 1936 and 219,833 metric tons in 1927. During 1937, Canada produced 42,550 metric tons of the metal and ranked fourth as a world producer of aluminium. The average price per pound for aluminium in 1937 was recorded at 20.08 cents by the American Bureau of Metal Statistics and is in excess of the price actually realized on large-scale business.

The United States Federal Power Commission reports that the consumption of electrical energy in the United States in 1936 for the manufacture of aluminium totalled approximately 2,597 million kilowatt hours and it estimates that the probable requirements of electrical energy for the production of the metal within five years will have increased to 3,600 million kilowatt-hours.

According to a report issued by the United States Bureau of Mines, The Aluminum Company of America started a \$26,000,000 expansion program in 1937, a large part of which will be completed in 1938. The consumption of aluminium cable in the United States was the greatest in the history of the industry and the transportation industry found new uses for the metal. The order of the Interstate Commerce Commission permitting the construction of aluminium tank cars for transportation of aviation gasoline opens a new field of use hitherto inaccessible. During 1936 the approximate consumption of primary aluminium in the United States, by industries, was as follows: transportation (land, air, and water), 20 per cent; machinery, 18 per cent; cooking utensils, 13 per cent; miscellaneous foundry and metal working, 13 per cent; electrical conductor, 12 per cent; iron and steel metallurgy, 5 per cent; chemical and building, 3 per cent each, and food products and miscellaneous, 13 per cent.

"After arranging to produce magnesium from domestic raw materials only, Germany is now endeavouring to develop a local source of alumina for the manufacture of aluminium. Experiments for one and a half years with the use of domestic clay, in a small pilot plant, have culminated in the construction of a large-scale experimental plant at Lippe. It is expected to be completed late in 1938 and by 1941 it is anticipated that expansion will permit it to supply a considerable part of the German alumina requirements. The Lippe works will belong to the dominant government-owned Vereingte Aluminium Werke A.G." (Mineral Trade Note—United States Bureau of Mines).

Table 142.—Imports into Canada and Exports of Aluminium, Alumina Bauxite and Cryolite, 1936 and 1937

	1936		1937	
	Cwt.	\$	Cwt.	\$
IMPORTS—				
Alumina.....	1,547	17,006	2,518	28,662
Bauxite ore.....	(a) 3,428,348	2,663,184	(c) 6,078,462	3,772,611
Cryolite.....	(b) 59,463	256,360	138,138	596,250
Aluminium in pigs, ingots, blocks, notch bars, slabs, billets and blooms.....	547	11,951	796	20,114
Aluminium scrap.....	6,882	120,099	12,343	197,989
Aluminium in bars, rods and wire.....	3,906	124,850	2,556	87,000
Aluminium in plates, sheets and strips, including circles.....	14,275	422,638	20,034	676,789
Aluminium pipes and tubes.....	513	27,299	1,458	77,312
Aluminium leaf, less than .005 mm. thick.....		8,378		6,859
Aluminium kitchen or household hollowware, n.o.p.....		67,129		82,580
Aluminium, manufactures of, n.o.p.....		669,715		788,794
Aluminium leaf, n.o.p., or foil less than .005 inch thick, plain or embossed.....		87,597		138,665
Aluminium powder..... lb.	109,777	39,372	246,799	86,733
Other.....		10,649		19,043
Total—Aluminium and its Products.....		4,526,227		6,579,401
EXPORTS—				
Aluminium scrap.....	20,461	273,866	27,187	375,518
Aluminium in bars, blocks, etc.—				
To United Kingdom.....	415,163	8,012,135	458,254	8,781,947
United States.....	26,487	487,446	256,453	3,814,524
Italy.....			9,921	201,112
Brazil.....	897	16,895	1,144	23,886
China.....	15,024	248,061	23,510	410,727
Australia.....	7,264	153,042	9,829	211,904
Japan.....	87,821	1,480,121	176,588	3,429,570
Germany.....	2,444	32,635	6,959	143,904
British India.....	3,887	77,538	602	14,036
Belgium.....	549	17,552	1,876	37,621
Mexico.....	994	22,773	368	11,088
Switzerland.....	6,613	113,664	1,328	27,648
Russia.....	20	482	9,274	217,574
Other countries.....	8,939	178,283	13,923	267,368
Total in bars, blocks, etc.....	576,102	10,840,627	970,029	17,592,909
Aluminium kitchen utensils and hollowware.....		20,228		21,780
Aluminium, manufactures of, n.o.p.....		363,761		633,268
Total—Aluminium and its Products.....		11,498,482		18,623,475

(a) 1,710,817 cwt. from the United States and 1,528,655 cwt. from British Guiana.

(b) 56,000 cwt. from Greenland.

(c) 2,548,600 cwt. from the United States and 3,529,234 cwt. from British Guiana.

Table 143.—Consumption of Aluminium in Specified Canadian Industries, 1936 and 1937

Industry	1936		1937	
	Pounds	Cost at works	Pounds	Cost at works
Aluminium products (a)*.....	18,686,000	\$ 3,559,403	21,660,000	\$ 4,118,972
White metal alloys*.....	1,052,658	215,761	1,186,128†	244,175
Electrical apparatus and supplies.....	1,511,279	505,481	1,733,533	743,718
Brass and copper products (b).....	1,953,996	298,651	2,423,015	394,807
Iron and steel products (b) (c).....	1,936,400	563,284	2,851,807	886,250

(a) Largely for the manufacture of cooking utensils, cable, etc.

*Not inclusive of possible scrap.

†In addition consumption of scrap aluminium was recorded at 1,309,181 pounds valued at \$166,762.

(b) Includes scrap.

(c) Includes industries manufacturing cooking and heating apparatus, sheet metal products, etc.

Table 144.—Estimated World Production of Aluminium, 1935-1937

(Supplied by Imperial Institute)

(Long tons)

Producing Country	1935	1936	1937	Producing Country	1935	1936	1937
BRITISH EMPIRE				FOREIGN COUNTRIES—concluded			
United Kingdom.....	14,900	16,000	19,000	Italy (c).....	13,558	15,623	22,585
Canada.....	21,100	25,800	41,000	Norway (c).....	14,750	15,162	23,043
Total.....	36,000	41,800	60,000	Spain.....	1,200	600	.....
FOREIGN COUNTRIES				Sweden (c).....	1,806	1,790	1,829
Austria.....	2,200	2,200	2,200	Switzerland.....	11,600	15,600	23,500
France.....	21,658	29,251	33,932	U.S.S.R.....	25,100	29,500	60,000
Germany (c).....	69,661	95,648	125,208	Yugoslavia.....	.....	.....	200
Hungary.....	300	900	1,000	United States (c) (b).....	53,257	100,415	130,661
				Japan.....	3,950	4,000	10,500
				Total.....	219,000	311,000	435,000
				World's Total.....	255,000	353,000	495,000

(b) Secondary metal was recovered as follows:—

1935.....	45,900 long tons
1936.....	46,000 "
1937.....	55,860 "

(c) Official figures.

Table 145.—World Production of Bauxite, 1935-1937

(Supplied by Imperial Institute)

(Long tons)

Producing Country	1935	1936	1937	Producing Country	1935	1936	1937
BRITISH EMPIRE				FOREIGN COUNTRIES—concluded			
British Guiana—(c).....				Germany.....	8,412	12,229	18,000
60% or more alumina.....	107,785	157,945	288,701	Greece.....	9,339	127,846	135,242
50-60% alumina.....	3,414	11,525	7,817	Hungary.....	207,745	323,893	444,444
30-50% alumina (b).....	26,410	39,851	64,413	Italy.....	167,378	258,104	380,391
Unfederated Malay States.....		36	19,000	Roumania.....	6,120	10,658	12,000
India.....	7,635	3,644	15,150	U.S.S.R. (estimated).....	130,000	200,000	250,000
Australia.....	1,156	740	7,766	Yugoslavia.....	212,694	287,560	352,167
Total.....	146,000	214,000	403,000	Mozambique.....	30	29	(a)
FOREIGN COUNTRIES				United States.....	233,912	372,005	420,232
Austria (estimated).....	3,000	3,000	3,000	Brazil (exports).....	.....	6,889	8,631
Czechoslovakia.....			833	Dutch Guiana (exports)....	113,370	230,215	386,133
France.....	504,750	639,250	677,300	French Indo-China.....	.....	30	7,000
				Netherland East Indies....	16,444	131,619	195,828
				Total.....	1,610,000	2,600,000	3,290,000
				World's Total.....	1,760,000	2,820,000	3,690,000

(a) Information not available.

(b) Ore remains at the mines.

(c) The shipments from mines of dried and washed ore were as follows (long tons):—

	1935	1936	1937
Metallurgical.....	75,139	116,645	241,932
Chemical.....	33,198	44,430	48,950
Refractory.....	2,581	6,021	7,295

Production (Exports) of Cryolite in Greenland

Year	Long tons
1933.....	10,187
1934.....	14,999
1935.....	23,104
1936.....	17,135
1937.....	50,822

ANTIMONY

There has been no commercial production of antimony metal in Canada since 1917 and no by-product output of the metal since 1926 in which year it was reported as contained in silver-lead-bismuth bullion produced from the cobalt-silver ores of Northern Ontario. The greater part of the refined antimony made in the Dominion during past years was produced from silver-lead ores at Trail, British Columbia, during 1907, 1909, 1915 and 1916 by the Consolidated Mining and Smelting Company of Canada, Limited. This company recently announced that antimony would again be produced commercially at Trail in 1938 and that the first unit of its new antimony plant, designed to recover metallic antimony from the by-products of the silver refinery, would have a capacity of between four and five tons of metallic antimony per day.

The first commercial shipment in several years of Canadian antimony ore was made in 1937. This ore was obtained from old dumps at a property located at West Gore, Hants County, Nova Scotia; it was auriferous and was exported for treatment to European plants. The antimony content was estimated at 48,163 pounds valued at \$7,394.

Minerals containing antimony also occur in New Brunswick, Quebec, Ontario, Manitoba, British Columbia, and the Yukon Territory. Stibnite (Sb_2S_3) occurs in the veins of the Reliance Gold Mines, Bridge River mining district, British Columbia, and in the same province at the property of the Gray Rock Mining Syndicate in the Truax Creek area, and at the Congress mine adjoining the Reliance property.

The market for antimony depends upon general industrial activity and especially upon the demand from automobile manufacturers as it is used largely in alloys for storage battery plates, bearing and babbitt metals, solder, rubber goods, paints and fixtures. There has been a substantial increase in the use of antimony in the manufacture of chemicals in the United States.

The antimony market in 1937 was characterized by wide fluctuations that resulted early in the year from the speculative boom in metals and later from events in China. Quotations for Chinese metal at New York ranged from a low of 13.75 cents per pound to a high of 18.25 cents, whereas the range in 1936 was 12.50 to 14.00 cents. In August, shipments of Chinese antimony to Shanghai via the Yangtze were cut off by the Japanese invasion, but towards the close of 1937 rail shipments to Hong Kong were established and exports resumed. These events, according to the United States Bureau of Mines, created a shortage of Chinese antimony in the world markets at times, but apparently consumers obtained adequate supplies from other sources.

Table 146.—Antimony Used in Specified Canadian Industries, 1936 and 1937

Industry	1936		1937	
	Pounds	\$	Pounds	\$
White metal alloys.....	(x) 541,398	63,026	(x) 573,575	79,936
Electrical apparatus and supplies.....	156,397	19,021	186,275	25,996

(x) Regulus. In addition the industry reported the consumption of 263,462 pounds of antimony ore valued at \$12,496 in 1937.

Table 147.—Imports of Antimony and Antimony Products into Canada, 1936 and 1937

	1936		1937	
	Pounds	\$	Pounds	\$
Antimony or regulus of, not ground, pulverized or otherwise treated...	1,279,535	109,656	1,176,790	136,836
Antimony oxide and titanium oxide (x).....	4,198,017	424,451	5,630,451	526,745
Antimony salts—tartar emetic, etc.....	45,366	7,149	53,293	10,340
Antimony salts for dyeing.....	366	40	336	42

(x) Including white pigments containing not less than 14 per cent by weight of titanium.

Table 148.—World Production of Antimony Ore, 1935-1937

(In terms of metal)
(Supplied by *Imperial Institute*)
(Long tons)

Producing Country	1935	1936	1937	Producing Country	1935	1936	1937
BRITISH EMPIRE				FOREIGN COUNTRIES—CON.			
Southern Rhodesia.....		84	78	Yugoslavia.....	200	1,600	3,850
Union of South Africa.....	5	17		Algeria.....	1,288	1,375	958
British Borneo (Sarawak).....	16	30	5	Morocco (French).....	220	35	26
Burma (estimated).....	10	40	30	Mexico.....	4,498	7,188	10,471
Australia.....	20	150	567	United States (b).....	499	674	1,130
FOREIGN COUNTRIES				Bolivia (exports).....	3,348	6,421	7,014
Austria.....		123	248	Honduras.....	5	1	(a)
Czechoslovakia.....	2,391	1,020	1,226	Peru.....	308	1,224	1,464
Greece.....	40	196	(a)	China.....	18,000	17,000	15,000
Italy.....	472	526	636	French Indo-China.....	20	46	6
Portugal.....		23	61	Japan (estimated).....	60	150	(a)
				Korea.....	2	17	(a)
				Turkey.....	101	562	659

(a) Information not available.

(b) Secondary metal was recovered as follows:—

1935.....	8,600 long tons.
1936.....	8,800 "
1937.....	11,018 "

BARIUM

Barium metal is used in relatively small quantities for the manufacture of certain electrical equipment; nickel-barium and nickel-copper-barium alloys, in the form of wire, have been employed in spark plug construction owing to their high thermionic electron emission. The metal has also been utilized in the vacuum tube industry because of its ability to remove the last traces of gases and to emit electrons easily. Barium has been produced in the United States, Germany, France and Great Britain but not yet commercially in Canada.

"Mineral Industry" reported in 1936 that, though the price of barium has been continuously reduced and "though it is probably now available at \$5.00 per pound and less, if quantity consumption could be developed, the amount produced and sold per annum is still very small."

BERYLLIUM

The principal ore of beryllium is the mineral beryl— $\text{Be}_2\text{Al}_2(\text{SiO}_3)_6$. There are several known occurrences of this mineral in Canada and shipments of beryl have been made for experimental purposes from deposits in Renfrew county, Ontario, and the Oiseau river area in Manitoba. Beryl usually occurs in pegmatites and is sometimes recovered as a by-product in the mining of the feldspar and mica content of these rocks. During 1936, Renfrew Minerals Limited reported the recovery of several tons of hand-picked beryl from a property worked in Lyndoch township, Renfrew county, Ontario; however, no commercial shipments of the mineral were reported in Canada during the year under review.

In 1937, Canadian Beryllium Mines and Alloys, Ltd., was incorporated to take over the assets of Renfrew Minerals Ltd.; some mining was conducted during the year and about 40 tons of cobbled beryl crystals stock-piled. International Beryllium Mining Syndicate was also formed in 1937 to prospect and mine for beryl in adjacent sections of Lyndoch township and the adjoining township of Brudenell.

Beryl has been extensively worked in the Jaipur State, Rajputana, India, where it is found in mica-bearing pegmatites. The output in 1935 was 139 tons and was exported to the United States and Germany. Production in this field in 1936 fell to 98 tons valued at £465. The Indian beryl is of high grade and brings from £7 to £10 per ton, c.i.f., in America and Europe.

Sporadic occurrences of beryl in the form of large crystals in pegmatites have been located over an extensive area in Namaqualand, Cape Province, South Africa. Only small quantities have been recovered, the production in 1936 amounting to 5.3 short tons valued at £38 compared with 58 tons worth £421 in 1935. There was no commercial production of beryllium ore in South Africa in 1937; there was, however, an output in the Transvaal of emerald (beryl) crystals valued at £10,838.

According to the United States Bureau of Mines, the domestic production of beryllium increased in 1937 but the industry is quite small, as is indicated by an estimated consumption of somewhat less than 500 tons of beryl in the United States and probably less than 500 tons in all other countries; these figures, only a careful guess, include in each instance an allowance of around 100 tons for beryl used directly in the ceramic industry. Some quantities of beryllium oxide and other compounds likewise are used in glass and ceramic glazes, as well as in super-refractories and as high-duty abrasives. Beryllium master alloys continue to be produced in the United States, principally by two companies, The Brush Beryllium Company, 3714 Chester Avenue, Cleveland, Ohio, and The Beryllium Corporation of Pennsylvania, Reading, Pa. No beryllium ores are smelted in Canada.

Beryllium-copper master alloy, 2.5 to 3 per cent beryllium, remainder copper, in lots 1 pound or more of beryllium, was quoted in the United States at \$23 per pound of contained beryllium—October, 1938. Beryllium ore was quoted per ton, carload lots, minimum 10 per cent BeO, \$30; minimum 12 per cent, \$35, f.o.b. mines.

BISMUTH

Bismuth production in Canada represents the metal recovered from silver-lead ores smelted at Trail, British Columbia, and the metal contained in silver-lead-bismuth bullion produced in the treatment of silver-cobalt ores at Deloro, Ontario.

Production of the metal in Canada, as thus defined, totalled 5,711 pounds valued at \$5,654 in 1937 compared with 364,165 pounds worth \$360,523 in 1936. Production in 1937 came entirely from Ontario, while in the preceding year the greater part of the metal was recovered at Trail, British Columbia.

Imports of metallic bismuth into Canada during 1937 totalled only 34 pounds valued at \$40 while in the same period the imports of bismuth salts were appraised at \$17,489.

It is estimated by the United States Bureau of Mines that pharmaceutical manufacturers consume more than three-fourths of all the bismuth used. The manufacture of low-melting-point and non-shrinking alloys provides the second largest outlet for bismuth.

The New York price for bismuth metal remained unchanged at \$1 per pound, in ton lots, throughout 1937, according to Engineering and Mining Journal's Metal and Mineral Markets. London quotations remained at 4s. per pound.

Table 149.—Production of Bismuth in Canada, 1928-1937

Year	Pounds	\$	Year	Pounds	\$
1928.....	14,002	5,067	1933.....	78,303	81,526
1929.....	194,329	307,114	1934.....	253,644	301,215
1930.....	12,732	6,366	1935.....	13,797	13,245
1931.....	118,207	157,650	1936.....	364,165	360,523
1932.....	16,855	7,340	1937.....	5,711	5,654

Table 150.—Bismuth Used in the Manufacture of Canadian Medicinal and Pharmaceutical Preparations, 1936 and 1937

Item	1936		1937	
	Pounds	\$	Pounds	\$
Bismuth metal.....	32,307	28,649	27,089	24,231
Bismuth salts.....	12,572	20,141	12,306	19,702

Table 151.—World Production of Bismuth Ore, Etc.*, 1935-1937

(Supplied by Imperial Institute)

(Cwt.)

Producing Country and Description	1935	1936	1937	Producing Country and Description	1935	1936	1937
BRITISH EMPIRE				FOREIGN COUNTRIES—Con.			
Union of South Africa—				Norway—			
Ore (<i>Bi content</i>).....	4		368	Copper ore (<i>Bi content</i>)...	16	11	7
Canada—				Roumania—			
Metal and content of bul-				Ore.....	280	900	530
lion.....	123	3,251	51	Mexico—			
Burma—				Ore (<i>Bi content</i>).....	4,204	3,259	2,789
Ore.....	2	1	2	Argentina—			
Australia—				Ore (<i>Bi content</i>).....	650	310	(a)
Ore, etc.....	470	361	180	Bolivia (exports)—			
				Ore, etc. (<i>Bi content</i>)....	412	1,257	610
FOREIGN COUNTRIES				Peru—			
France—				Lead-silver bullion, etc.			
Mispickel (<i>Bi content</i>).....		78	(a)	(<i>Bi content</i>).....	193	166	(b) 362
Metal.....		80	(a)	Metal.....	2,966	7,341	(b) 1,751
Germany (Saxony)—				Japan—			
Ore (<i>Bi content</i>).....	80	(a)	(a)	Metal.....	1,060	1,100	(a)

* Bismuth ore is also produced in Spain and China and the metal recovered as a by-product in the United Kingdom, France, Sweden, U.S.S.R. and the United States.

(a) Information not available.

(b) Exports.

CADMIUM

Cadmium production in Canada represents the recovery of the metal as a by-product in the electrolytic refining of zinc. Production up to 1935 came entirely from the treatment of zinc-bearing ores at Trail, British Columbia, by the Consolidated Mining and Smelting Company of Canada, Limited. The commercial production of the metal from the copper-gold-silver-zinc ores of the Flin Flon mine was commenced in Manitoba for the first time in 1936.

The output of cadmium in the Dominion in 1937 totalled 745,207 pounds valued at \$1,222,140 compared with 785,916 pounds at \$699,465 in 1936; the value of the 1937 production was an all-time high record in Canadian production of the metal; of the 1937 production, 436,431 pounds valued at \$715,747 were credited to British Columbia, 164,223 pounds at \$269,326 to Manitoba, and 144,553 pounds at \$237,067 to Saskatchewan. The proportioning between Manitoba and Saskatchewan of the cadmium recovered by the Hudson Bay Mining & Smelting Company results from the interprovincial boundary intersecting the orebody of the Flin Flon mine.

Cadmium is consumed largely in the manufacture of alloys and for plating, also in the making of such pigments as cadmium lithopone, cadmium yellows, etc. A relatively large quantity of the metal is used in the production of bearing metals for high-speed internal combustion engines. According to the United States Bureau of Mines the only cadmium-bearing alloys that have been used commercially in the United States are the Cd-Ni, Cd-Ag-Cu, and Cd-Ag. groups.

The average price of cadmium in the United States for 1937 was estimated by the Engineering and Mining Journal at \$1.223 per pound compared with 55 cents from 1931 to 1934.

Table 152.—Cadmium Production in Canada, 1928-1937

Year	British Columbia		Manitoba		Saskatchewan	
	Pounds	\$	Pounds	\$	Pounds	\$
1928.....	491,894	341,374				
1929.....	773,976	675,294				
1930.....	456,582	337,871				
1931.....	323,139	180,958				
1932.....	65,425	26,824				
1933.....	246,041	78,733				
1934.....	293,611	95,665				
1935.....	580,530	441,203				
1936.....	526,034	468,170	148,133	131,838	111,749	99,457
1937.....	436,431	715,747	164,223	269,326	144,553	237,067

In 1937 there were 65,796 pounds of cadmium valued at \$84,993 used in the Canadian white metal alloys industry; the consumption of the metal in the same industry during 1936 was 48,949 pounds, worth \$41,561.

Statistics relating to Canadian exports or possible imports of cadmium are not published separately by the Department of National Revenue, Ottawa.

Table 153.—World Production of Cadmium, 1935-1937

(Supplied by *Imperial Institute*)

(Lb. avdp.)

Producing Country	1935	1936	1937	Producing Country	1935	1936	1937
BRITISH EMPIRE				FOREIGN COUNTRIES—Con.			
United Kingdom.....		49,956	273,688	Germany.....	364,000	668,000	783,000
South West Africa (d).....	320,000	218,000	305,000	Italy.....	35,300	33,000	44,000
Canada.....	580,530	785,916	745,207	Norway.....	260,143	224,598	339,935
Australia.....	489,666	555,180	464,311	Poland.....	248,458	310,000	274,000
				U.S.S.R.....	26,400	250,000	(a)
FOREIGN COUNTRIES				United States—			
Belgium.....	332,898	452,000	598,000	Metal.....	3,477,091	3,633,495	3,995,739
France.....	266,759	185,000	218,000	Compounds (metal cont.)	507,400	626,800	828,000
				Mexico (b).....	1,317,321	1,172,894	1,366,407

Cadmium is also produced in Sweden and Japan.

(a) Information not available.

(b) Including cadmium content of flue dust, etc., exported for treatment.

(d) Estimated cadmium content of shipment of dust from stock to Germany.

CALCIUM

Calcium metal is employed chiefly as a deoxidizer of magnesium, aluminium, nickel and various non-ferrous alloys. The metal also affects the density and grain size favourably and inhibits carbide formation in special steels. No production of metallic calcium was reported in Canada in 1937. Metal and Mineral Markets, New York, recorded the price of calcium in October, 1938, at 75 cents per pound for 98 to 99 per cent lump, in ton lots.

CHROMITE

The mineral chromite (FeO , Cr_2O_3) is the commercial source of the metal chromium; it is also used extensively in the manufacture of refractory brick. The metal is a necessary constituent of many high-speed cutting tools, certain armour plate, and stainless steels. Chromite is also used in the manufacture of chromic acid for electroplating and in the manufacture of chemicals used chiefly in the dyeing, tanning and pigment industries.

The principal chromite producing countries are Russia, South Africa, Turkey, Southern Rhodesia, Cuba, New Caledonia, Yugoslavia, India, and Philippine Islands. Production of the mineral in Canada during recent years has been relatively small, coming almost entirely from the Eastern Townships, Quebec. During the past few years considerable development work was conducted on a chromite deposit located at Obongo Lake, in the Thunder Bay district of Ontario; shipments were made from this property in 1935, 1936 and 1937. The owners of this mine, The Chromium Mining and Smelting Corp. Ltd., also operated a modern electric smelting plant at Sault Ste. Marie, Ontario, for the production of ferrochrome and ferrosilicon.

In British Columbia, exploration and development work has been conducted during the past on several chromite deposits but there have been no reports of recent activities at these properties with the exception of some surveying completed in 1937 by the Consolidated Mining and Smelting Company of Canada, Limited, at chromite claims located near Ashcroft.

Production of chromite ore in Canada in 1937 was valued at \$43,250 of which \$39,964 were credited to ores mined in Ontario and \$3,286 to the province of Quebec.

Statistics relating to Canadian imports and exports of chromite are not published separately.

October, 1938, chrome ore quotations by Metal and Mineral Markets, New York, were—long ton, c.i.f. Atlantic ports, Indian ores, \$18.00 for 43 to 45 Cr_2O_3 ore, and \$22.00 to \$23.00 for 48 to 50 per cent ore. Russian ores: 45 per cent Cr_2O_3 , nominal. Turkish chrome ore, per long ton, c.i.f. Atlantic ports: concentrate 52 per cent, \$25.50; 48 to 49 per cent, \$24.50. Lump, 48 to 49 per cent, \$24.50. London, 85s. to 95s. for 48 per cent first quality Rhodesian.

Table 154.—Production of Chromite in Canada, 1928-1937

Year	Short tons	\$	Year	Short tons	\$
1928.....			1933.....	30	343
1929.....	126	900	1934.....	111	1,578
1930.....			1935.....	1,144	14,947
1931.....			1936.....	(a)	13,578
1932.....	78	1,113	1937.....	(a)	43,250

(a) Quantity not published.

Table 155.—Imports of Chromium and Chromium Products into Canada, 1936 and 1937

	1936		1937	
	Pounds	\$	Pounds	\$
Chromium metal and tungsten metal, in lumps, etc., when imported by manufacturers for alloying purposes.....	140,834	60,382	122,288	96,900
Nickel chromium in bars or rods not more than 0.75 inch diameter containing 60% + nickel and 10% + chromium for use as electric resistance wire, etc.....	52,825	51,170	46,246	45,264
Chrome firebrick.....		68,082		103,267
Bichromate of potash—crude.....	139,735	11,556	136,454	11,603
Bichromate of soda.....	2,959,488	178,167	2,958,505	175,431

Table 156.—Consumption of Certain Chromium Products and Chrome Ore in Specified Canadian Industries, 1936 and 1937

Industry	Item	1936		1937	
		Pounds	\$	Pounds	\$
Ingots and Castings.....	Chrome ore.....	725,760	9,965	1,158,000	20,602
Ingots and Castings.....	Ferrochrome.....	1,223,040	106,961	1,734,000	167,531
Paints, Pigments and Varnishes.....	Chrome colours.....	1,333,542	193,794	1,470,347	219,078
Paints, Pigments and Varnishes.....	Sodium bichromate.....	530,521	41,867	573,267	46,157
Leather Tanning.....	Sodium bichromate.....	1,789,054	151,496	1,822,343	139,212
Glass Manufacture.....	Chromite.....	(a)	(a)	52,000	996

NOTE.—In addition to the items listed above, a considerable quantity of chromite is utilized in the manufacture of Canadian ferro-alloys, also a relatively small quantity of sodium bichromate is consumed in the chemical industry. Chromite is also employed in Canada in the manufacture of refractories.

(a) Not recorded.

Table 157.—World Production of Chrome Ore, 1935-1937

(Supplied by *Imperial Institute*)
(Long tons)

Producing Country	1935	1936	1937	Estimated Cr ₂ O ₃ content*		
				1935	1936	1937
BRITISH EMPIRE						
United Kingdom.....			300			75
Sierra Leone (shipments).....			729			328
Southern Rhodesia.....	104,240	180,499	271,265	51,100	88,400	132,900
Union of South Africa.....	89,003	172,896	165,958	39,188	75,746	74,349
Cyprus.....	1,179	500	1,615	600	250	800
Canada.....	1,021	824	(d)	(a)	(a)	(a)
India.....	39,127	49,486	62,307	20,000	25,000	31,000
Australia.....	595	415	459	(a)	(a)	(a)
Total.....	235,000	405,000	503,000			
FOREIGN COUNTRIES						
Bulgaria.....	320	266	2,313	150	120	1,064
Greece (b).....	29,309	46,599	51,789	11,637	18,109	21,100
Norway.....			173			78
U.S.S.R. (e).....	181,500	216,000	(a)	(a)	(a)	(a)
Yugoslavia.....	51,540	53,190	58,918	24,700	18,400	28,000
Cuba (f).....	42,081	69,257	93,098	12,000	19,000	30,179
United States.....	515	269	2,321	200	100	1,000
Brazil (exports).....	5	3,829	837	(a)	(a)	(a)
Japan.....	35,736	37,868	(a)	14,300	15,100	(a)
Philippine Islands.....	(c) 1,272	2,873	75,209	570	1,300	34,000
Turkey.....	148,096	161,292	189,468	74,000	81,000	90,000
New Caledonia.....	54,437	47,000	47,264	27,200	24,000	24,000
Total.....	545,000	640,000	(a)			
World's Total.....	780,000	1,040,000	(a)			

* Only approximate estimates can be given owing to the wide variation in the chromium content of the ore produced in several of the countries concerned.

(a) Information not available.

(b) Figures for 1937 refer to exports.

(c) Exports.

(d) Recorded by value only (£8,755).

(e) Probably includes some ore needing concentration.

(f) Figures for 1935 refer to exports and for 1937 are imports into the United States from Cuba.

IRON ORE

No iron ores, known as such, have been mined in Canada for some years. Nova Scotia with its large iron and steel industry is not a producer of iron ore. The large deposits of high grade ore in Newfoundland, owned by the Dominion Steel and Coal Corporation, are much more readily accessible and of a higher and more constant grade than the iron ore deposits in Nova Scotia.

Iron ore was first mined and smelted in the province of Quebec early in the eighteenth century, and from that time until 1883, the industry was carried on almost continuously at Three Rivers in the St. Maurice district. Other furnaces using local ore were operated at Radnor Forges and Drummondville, the last to shut down being the Drummondville furnace in 1911. At the present time only titaniferous ore is mined in Quebec; this ore is produced near Baie St. Paul and is shipped for its titanium content.

More iron ore has been produced in Ontario than in any other province; in northwestern Ontario, about 1899, a deposit of hematite, that later developed into the Helen mine, was found. This property was the main source of Ontario's iron ore output for a number of years. The province has a large supply of low-grade iron ore, but beneficiation processes must be applied to make these ores suitable for commercial use.

During 1937 the Algoma Ore Properties Ltd. commenced rebuilding the surface equipment at the New Helen iron mine in Michipicoten and sampling of the Moose Mountain iron property near Sellwood, in the Sudbury district, was commenced by the M. Hanna Company of Cleveland. No operations at these properties were reported during the first half of 1938.

According to the Ontario Department of Mines, a new discovery of hematite iron ore at Steep Rock Lake near Atikokan, Ontario, the first of bessemer grade ever found in Ontario, was reported in March of 1938. This deposit, which might prove of extreme importance to the industrial life of the province and to Canada generally, has been outlined by diamond-drilling on behalf of the Sterola Exploration Company. Early drilling indicated a mass of ore at least 700 feet long and 150 feet wide. This grade of hematite ore requires no beneficiation prior to smelting.

Legislation passed by the Ontario Legislature has provided that a bounty of two cents per unit of iron will be paid to possible producers of iron ores for a period of ten years, commencing January 1, 1939.

Different varieties of iron ore are found in various parts of British Columbia, the most important of which are the magnetite deposits which occur on the islands along the coast.

Imports of iron ore into Canada during 1937 totalled 2,124,972 short tons valued at \$4,721,387 compared with 1,317,033 tons at \$2,633,925 in 1936. Of the imports in 1937, those from the United States totalled 1,416,015 tons worth \$3,391,877 and those from Newfoundland, 659,125 tons at \$1,188,771. Relatively smaller tonnages of iron ore were also received from Brazil, French Africa; and Norway.

"Metal and Mineral Markets"—New York—quoted iron ores, October, 1938: per long ton, Lower Lake ports—Lake Superior ore quotations—Mesabi, non-bessemer, 51½ per cent iron, \$4.95. Old range, non-bessemer, \$5.10. Mesabi, bessemer, 51½ per cent iron, \$5.10. Old range bessemer, 51½ per cent, \$5.25. Eastern ores, cents per long ton unit, delivered at furnaces: Foundry and basic, 56 to 63 per cent, 9 to 10 cents.

Table 158.—Shipments of Iron Ore from Wabana Mines, Newfoundland, 1928-1937

Year	To Nova Scotia	To United States	To Europe	Total shipments
	Short tons	Short tons	Short tons	Short tons
1928.....	690,316	41,493	1,001,833	1,733,642
1929.....	763,168	85,501	850,370	1,699,039
1930*.....	523,918	54,623	740,774	1,319,315
1931.....	234,148	25,670	530,079	789,897
1932*.....	.....	.....	166,303	166,303
1933.....	.....	.....	254,383	254,383
1934*.....	346,178	.....	344,769	690,947
1935.....	611,581	.....	81,123	692,704
1936.....	527,540	12,656	252,676	792,872
1937.....	702,714	50,490	1,242,088	1,995,292

* European shipments in 1930, 1932 and 1934 were to Germany only, while in 1935, 1936 and 1937 shipments went both Germany and Great Britain.

Table 159.—Imports into Canada and Exports of Iron Ore, 1936 and 1937

	1936		1937	
	Quantity	Value	Quantity	Value
	Short tons	\$	Short tons	\$
IMPORTS—				
Iron ore from the United States.....	755,414	1,598,704	1,416,015	3,391,877
Iron ore from Newfoundland.....	489,036	873,395	659,125	1,188,771
Iron ore from other countries.....	72,583	161,826	49,832	140,739
Total.....	1,317,033	2,633,925	2,124,972	4,721,387
EXPORTS—Total.....	2,725	8,669	4,644	14,297

Table 160.—World Production of Iron Ore, 1935-1937

(including Manganiferous Iron Ore)

(Supplied by *Imperial Institute*)

(Long tons)

Producing Country	Ore			Estimated Iron Content		
	1935	1936	1937	1935	1936	1937
BRITISH EMPIRE						
United Kingdom (b).....	10,895,385	12,701,386	14,214,995	3,268,616	3,810,416	4,264,499
Northern Rhodesia.....			520			(a)
Sierra Leone (shipments).....	433,540	566,595	633,985	247,100	323,000	361,400
South West Africa.....			14,054			6,605
Union of South Africa.....	299,247	359,219	454,505	188,615	231,373	290,701
Newfoundland.....	662,441	893,308	1,609,723	344,000	378,000	840,000
Burma.....	23,085	25,316	25,426	15,000	17,000	16,500
India.....	2,341,212	2,526,931	2,870,832	1,500,000	1,620,000	1,840,000
Federated Malay States.....	(a)	449	1,147	(a)	(a)	(a)
Unfederated Malay States.....	1,411,636	1,654,547	1,660,342	900,000	1,060,000	1,060,000
Australia.....	1,874,350	1,889,599	1,870,954	1,237,000	1,247,000	1,235,000
New Zealand.....	10,646		571	4,900		250
Total.....	17,950,000	20,450,000	23,360,000			
FOREIGN COUNTRIES						
Austria.....	763,175	1,008,110	1,854,927	264,997	358,062	661,043
Belgium.....	161,920	187,649	261,415	73,000	86,000	118,000
Belgium.....	2,333	6,159	11,732	1,516	4,003	7,486
Czechoslovakia.....	719,512	1,072,414	1,807,490	237,693	346,626	589,960
France.....	31,539,780	32,775,667	37,252,386	11,000,000	11,500,000	13,000,000
Germany.....	5,947,855	7,450,638	9,636,974	1,819,361	2,222,989	2,715,044
Greece.....	200,922	275,845	295,752	97,196	131,522	146,034
Hungary.....	189,357	275,256	284,948	63,466	92,293	95,000
Italy.....	559,771	844,513	1,000,219	250,000	422,000	504,000
Luxemburg.....	4,068,520	4,818,667	7,643,597	1,248,689	1,452,872	2,205,083
Norway.....	753,067	833,435	992,301	489,443	542,020	643,754
Poland.....	327,059	461,253	767,830	103,000	147,000	244,000
Portugal.....	866	6,436	7,578	400	3,500	3,012
Roumania.....	92,331	106,835	126,967	41,000	48,000	57,000
Spain.....	2,591,570	(a)	(a)	1,220,000	(a)	(a)
Sweden.....	7,807,566	11,071,933	14,716,394	4,783,000	6,744,470	8,991,371
Switzerland.....	3,813	10,000	70,000	(a)	(a)	(a)
U.S.S.R.....	26,421,000	27,477,000	(a)	(a)	(a)	(a)
Yugoslavia.....	231,022	443,738	609,713	116,000	222,000	305,000
Algeria.....	1,648,171	2,136,248	2,288,000	873,500	1,132,000	1,200,000
Belgian Congo.....	8,400	(a)	(a)	(a)	(a)	(a)
Egypt.....	15			7		
Morocco (French).....			65,744	(a)	(a)	(a)
Morocco (Spanish).....	1,149,323	1,036,355	1,400,000	632,000	570,000	770,000
Tunis.....	496,000	715,000	928,858	257,000	367,000	471,806
Cuba (shipments).....	224,801	449,612	488,420	100,000	200,000	220,000
Mexico.....	94,080	121,176	133,869	60,257	77,630	88,300
United States (c).....	31,064,436	49,729,264	73,434,520	15,500,000	24,900,000	36,700,000
Brazil.....	(a)		182,708	(a)	(a)	(a)
Chile.....	835,987	1,332,325	1,505,542	508,989	802,592	920,000
French Indo-China.....	625	9,859	32,764	271	4,793	
Japan.....	507,718	742,500	(a)	(a)	(a)	(a)
Korea.....	588,663	(a)	(a)	341,000	(a)	(a)
"Manchoukuo".....	1,454,598	(a)	(a)	(a)	(a)	(a)
Philippine Islands.....	278,836	529,041	681,698	(a)	(a)	(a)
Total.....	122,000,000	150,000,000	190,000,000			
World's Total.....	140,000,000	170,000,000	214,000,000			

(a) Information not available.

(b) In addition bog ore and iron ore (not used for smelting) were produced as follows:—

1935.....

7,986 long tons

1936.....

7,224 "

1937.....

8,243 "

(c) Including shipments of manganiferous iron ore up to 35 per cent Mn.

IRON AND STEEL AND THEIR PRODUCTS

The Primary Iron and Steel Industry

Statistics for the Primary Iron and Steel Industry include data for all establishments in Canada which were engaged chiefly in the manufacture of (a) pig iron, (b) ferro-alloys, (c) steel ingots and steel castings, (d) hot rolled iron and steel products, (e) cold rolled or cold drawn steel bars, strips and shapes. Forty firms were included in this industry in 1937 and reports were received for 55 different plants or departments, including 4 blast furnace departments, 4 ferro-alloy plants, 31 steel furnace divisions, and 16 rolling or drawing mills. Separate reports were received for blast furnace departments, steel furnace divisions and rolling mills even when they were really units of a single works.

Factory sales of pig iron, ferro-alloys, steel ingots and castings, and finished rolled products were 55 per cent higher in 1937 than in 1936, the values being \$72,280,669 and \$46,636,892, respectively. The 1937 figure was, in fact, the highest on record since 1920 being slightly above the 1929 total of \$72,231,995. The 25 works in Ontario reported sales at \$44,928,609 or 62 per cent of the total for Canada; 6 plants or departments in Nova Scotia accounted for \$14,883,039 or 20 per cent, and 14 works in Quebec for \$10,416,386 or 14 per cent. There were also 4 operating plants in Manitoba, 1 in Alberta, and 5 in British Columbia.

Capital employed in 1937 amounted to \$96,875,377, including \$65,896,104 as the value of land, buildings and plant equipment, \$21,377,846 as the value of inventories of raw and finished materials on hand and in process, and \$9,601,517 as the total of operating capital such as cash, bills and accounts receivable, etc. For works in Ontario the capital was \$59,959,463; for Nova Scotia, \$21,337,252; for Quebec, \$13,202,552; for Manitoba, \$2,032,194; and for Alberta and British Columbia, \$343,916.

The average number of employees in 1937 was 14,054, an increase of 26 per cent over the 1936 average of 11,138. About 981 persons worked in the blast furnace departments in 1937, 505 in ferro-alloy plants, 5,264 in steel furnace divisions, and 7,304 in rolling mills. About 59 per cent of the total, or 8,360, were employed in Ontario, 2,866 in Quebec, 2,316 in Nova Scotia, 387 in Manitoba, and 125 in Alberta and British Columbia.

Payments in salaries and wages amounted to \$19,926,498 in 1937, an advance of 44 per cent over the 1936 total of \$13,830,377. Salaries increased to \$2,643,902 from \$2,180,091 and wages rose to \$19,926,498 from \$13,830,377.

The cost of manufacturing materials was \$33,805,631 in 1937 compared with \$21,424,052 in 1936, and the cost of fuel and electricity was \$6,934,008 against \$5,440,129, an increase of 58 per cent for materials and 27 per cent for fuel and power.

PIG IRON

The output of pig iron in 1937 amounted to 898,855 long tons, an advance of 32 per cent over the 1936 total of 678,231 tons and the highest tonnage on record since 1929 when 1,080,160 tons were made. Production of basic iron was given at 721,711 tons or 80 per cent of the total; malleable iron amounted to 71,735 tons and the foundry grade to 105,409 tons.

Producers' sales of pig iron in 1937 totalled 225,716 long tons valued at \$5,146,017 compared with 168,054 tons at \$3,327,716, an increase of 34 per cent in quantity and 55 per cent in value.

Imports of pig iron during the calendar year advanced to 6,371 long tons from 3,960 tons in 1936 and exports rose to 38,516 tons from 13,904 tons.

Stocks held by the producers increased to 112,287 tons at the end of 1937 from 76,829 tons at the close of the previous year.

The apparent consumption of pig iron in Canada during 1937, as computed by deducting the exports from the sum of production and imports and allowing for the change in producers' stocks, amounted to 831,252 tons compared with 678,804 tons in 1936 and 573,327 tons in 1935.

Charges to iron blast furnaces during 1937 included 1,604,073 long tons of iron ore, 890,384 short tons of coke, 470,549 short tons of limestone, 119,910 long tons of mill cinder, etc., and 16,467 long tons of scrap.

The four producers of pig iron in Canada have 10 blast furnaces available for use which, if operated at the rated capacity, could produce 1.45 million tons of pig iron per year. Actual production in 1937 at 898,855 tons was about 62 per cent of capacity. Only 6 blast furnaces were used during the year.

FERRO-ALLOYS

Production of ferro-alloys of all kinds in 1937 amounted to 82,072 long tons compared with 76,284 tons in 1936 and 56,616 tons in 1935.

Ferrosilicon was made by 9 different concerns of which 5 recovered small tonnages as a by-product in the manufacture of fused alumina and 4 made various commercial grades as a primary part of their operations. The total quantity made, all grades, in 1937 was 32,542 long tons.

Spiegeleisen was made by two companies, ferromanganese by one company only, ferrochrome by two concerns, and ferrophosphorus by only one concern.

STEEL INGOTS AND STEEL CASTINGS

Steel production advanced 26 per cent to 1,402,882 long tons in 1937 from 1,115,779 tons in the previous year, the output of ingots increasing to 1,336,228 tons from 1,081,549 tons and the production of castings advancing to 66,654 tons from 34,230 tons. Practically all of the ingots were transferred to the producers' rolling mills while most of the castings were made for sale. The factory sales of ingots and castings totalled 64,907 long tons valued at \$10,616,508 compared with 28,030 tons at \$4,788,296 in 1936.

The 31 steel plants which were in operation during 1937 operated 85 furnaces of which 41 were basic open hearth with total rated annual capacity of 1,828,000 long tons, 41 were electric furnaces with total capacity of 235,800 tons, and 3 were converters with total capacity of 3,800 tons. Two steel plants were idle during the year, 1 electric furnace in Ontario and 1 basic open hearth furnace in Alberta, with a combined capacity of about 40,000 tons per year. Steel ingots were made in 8 establishments; 3 made basic open hearth ingots only, 3 made electric ingots only, and 2 made both basic open hearth ingots and electric ingots. Steel castings were made in 27 works; 3 made basic open hearth castings only, 19 made electric castings only, 2 made converter castings only, 2 made both open hearth and electric castings, and 2 made both converter and electric castings.

Steel furnaces in operation in 1937 used 667,631 long tons of pig iron, 24,361 long tons of ferro-alloys, 896,242 long tons of scrap, 87,165 long tons of ore, 125,922 short tons of limestone, 9,039 short tons of fluorspar, 53,066 short tons of dolomite, and 8,994 short tons of magnesite.

ROLLED AND DRAWN STEEL

In 1937 there were 13 hot rolling mills in operation, 1 cold rolling plant and 2 making cold drawn shapes. Nine of these mills were in Ontario, 3 in Quebec, 3 in Nova Scotia, and 1 in Manitoba. One rolling mill in Ontario and 1 in Alberta were idle throughout 1937.

The value of sales from these works amounted to \$52,916,950 in 1937, an increase of 47 per cent over the corresponding total of \$36,054,165 for 1936. The main items were—hot rolled bars, 287,067 long tons at \$18,066,438; plates, sheets and strips, 189,580 tons at \$11,261,521; rails and rail fastenings, 105,436 tons at \$4,976,628; semi-finished rolled forms, 187,070 tons at \$6,300,039; structural steel, 84,340 tons at \$4,605,796; wire rods, 86,177 tons at \$3,568,873; cold rolled and cold drawn bars, 15,022 tons at \$1,632,606, and miscellaneous products (not rolled), \$2,505,049.

The net amount of rolled forms produced in 1937 was 1,083,293 long tons, including 1,606 tons of iron and 1,081,687 tons of steel.

Imports of rolling mill products were valued at \$44,792,419 in 1937 compared with \$27,867,397 in 1936. Shipments from the United Kingdom were worth \$16,595,378, and purchases from the United States were appraised at \$26,507,317.

Table 161.—Provincial Distribution of Active Plants in the Primary Iron and Steel Industry, 1937

Province	Number of firms	Pig iron		Steel ingots and castings		Rolling and drawing mills	Ferro-alloys (a)
		Number of plants	Number of blast furnaces	Number of plants	Number of steel furnaces		
Nova Scotia.....	4	1	3	2	13	3	.....
Quebec.....	13	.....	.....	10	17	3	1
Ontario.....	16	3	7	10	41	9	3
Manitoba.....	3	.....	.....	3	4	1	.....
Alberta.....	1	.....	.....	1	1	.....	.....
British Columbia.....	5	.....	.....	5	9	.....	.....
Canada.....	42	4	10	31	85	16	4

(a) Not including plants which made ferrosilicon as a by-product.

Table 162.—Principal Statistics of the Primary Iron and Steel Industry, 1929-1937

Years	Number of plants	Capital employed	Average number of employees	Salaries and wages	Cost of fuel and electricity at works	Cost of materials at works	Gross selling value of products at works
		\$		\$	\$	\$	\$
1929.....	45	109,446,529	11,218	18,534,681	6,691,961	32,514,596	72,231,995
1930.....	49	112,079,926	9,723	14,934,325	5,182,136	22,765,648	52,588,935
1931.....	53	104,512,104	8,026	11,072,054	3,757,243	15,291,414	36,911,245
1932.....	52	96,323,629	4,847	6,131,057	2,367,122	6,289,483	16,197,526
1933.....	50	96,444,846	5,200	6,049,189	2,699,837	7,598,931	18,492,549
1934.....	51	90,079,004	7,400	9,009,512	3,969,136	12,673,398	29,101,463
1935.....	53	86,465,490	9,523	12,279,390	4,845,559	18,539,072	38,700,961
1936.....	55	92,103,774	11,138	13,830,377	5,440,129	21,424,052	46,636,892
1937							
Nova Scotia.....	6	21,337,252	2,316	3,342,720	1,515,253	7,086,235	14,883,039
Quebec.....	14	13,202,552	2,866	3,590,722	942,262	4,191,863	10,416,386
Ontario.....	25	59,959,463	8,360	12,323,970	4,255,030	21,903,343	44,928,609
Manitoba.....	4	2,032,194	387	507,625	192,270	533,946	1,606,032
Alberta.....	1	.....	.....	.....	.....	.....	.....
British Columbia.....	5	343,916	125	161,461	29,193	90,244	446,603
Canada.....	55	96,875,377	14,054	19,926,498	6,934,008	33,805,631	72,280,669

Table 163.—Production of Pig Iron and Sales by the Producers, 1936 and 1937

Grades	Total tonnage made	Sales	
		Quantity	Income from sales
	Long tons	Long tons	\$
1936			
Basic.....	530,929	22,161	495,911
Foundry.....	85,043	83,552	1,622,190
Malleable.....	62,259	62,341	1,209,615
Total.....	678,231	168,054	3,327,716
1937			
Basic.....	721,711	60,945	1,366,695
Foundry.....	105,409	98,181	2,270,774
Malleable.....	71,735	66,590	1,508,548
Total.....	898,855	225,716	5,146,017

Table 164.—Materials Charged to Iron Blast Furnaces, 1936 and 1937

Materials	1936		1937	
	Quantity	Cost at furnace	Quantity	Cost at furnace
		\$		\$
Foreign iron ore..... long ton	1,218,823	4,010,500	1,604,073	5,372,263
Mill cinder, scale, etc..... long ton	49,091	144,725	119,910	376,162
Scrap (net charge)..... long ton	20,386	177,923	16,467	159,825
Limestone—				
From Canadian quarries..... short ton	120,275	148,323	162,531	207,264
From foreign sources..... short ton	225,347	212,333	308,018	254,302
Coke..... short ton	672,210	3,588,303	890,384	4,858,455
Other materials.....		49,610		41,093
Total.....		8,331,717		11,299,364

Table 165.—Imports into Canada and Exports of Pig Iron, 1927-1937

Years	IMPORTS		EXPORTS	
	Long tons	\$	Long tons	\$
1927.....	40,922	781,832	344	7,752
1928.....	43,307	791,733	1,043	20,642
1929.....	32,548	624,891	7,478	151,967
1930.....	13,643	270,157	593	12,653
1931.....	7,912	148,951	2,787	55,183
1932.....	4,753	78,845	2,029	38,816
1933.....	2,459	43,298	11,903	214,195
1934.....	6,419	108,300	9,221	176,093
1935.....	8,920	143,726	13,759	287,396
1936.....	3,960	74,589	13,904	304,682
1937.....	6,371	144,354	38,516	851,701

Table 166.—Blast Furnaces in Canada, 1937

Names of companies	Location of plants	Number of stacks	Total daily capacity (24 hours)	Number of days in blast		
				1935	1936	1937
			(Long tons)			
Dominion Steel and Coal Corporation Ltd.	Sydney, N.S.....	1	350	62	366	357
		1	300	.....	92	.....
		1	550	365	228	363
Total.....		3	1,200			
Canadian Furnace Company, Limited.....	Port Colborne, Ont.....	1	350	238	224	245
The Steel Company of Canada, Limited..	Hamilton, Ont.....	1	275	.....	165	365
		1	550	365	366	365
Total.....		2	825			
Algoma Steel Corporation, Limited.....	Sault Ste. Marie, Ont.....	1	300	.....	.....	.....
		1	300	.....	.....	.....
		1	450	326	230	365
		1	550	.....	.....	.....
Total.....		4	1,600			
Total for Canada.....		10	3,975			

Table 167.—Production of Ferro-Alloys, 1927-1937

Years		Long tons	Years		Long tons
1927.....	56,230	1933.....	30,133		
1928.....	44,842	1934.....	31,921		
1929.....	89,116	1935.....	56,616		
1930.....	65,223	1936.....	76,284		
1931.....	46,764	1937.....	82,072		
1932.....	16,161				

Table 168.—Production of Steel Ingots and Direct Steel Castings, by Grades, 1927-1937

(Long tons)

Years	Steel ingots		Direct steel castings			Total steel ingots and castings
	Open hearth	Electric	Open hearth	Converter	Electric	
1928.....	1,189,399	602	20,109	2,019	22,590	1,234,719
1929.....	1,295,162	14,444	35,806	2,590	30,022	1,378,024
1930.....	925,427	30,051	24,772	2,314	27,014	1,009,578
1931.....	612,437	25,017	14,760	590	19,305	672,109
1932.....	308,700	19,670	2,616	846	7,514	339,346
1933.....	378,666	15,393	5,017	238	10,615	409,979
1934.....	713,227	23,891	6,457	507	13,700	757,732
1935.....	872,444	36,742	9,119	645	22,577	941,527
1936.....	1,037,713	43,836	10,208	575	23,447	1,115,779
1937.....	1,274,992	61,236	23,827	1,016	41,811	1,402,882

Table 169.—Materials Used in Steel Furnaces, 1936 and 1937

Materials	1936		1937	
	Quantity	Cost of purchased materials	Quantity	Cost of purchased materials
	Long tons	\$	Long tons	\$
(a) Metals:—				
Pig iron—Own make.....	516,374		633,034	
Purchased.....	5,369	123,172	34,597	773,104
Sponge iron.....				7,132
Spiegeleisen.....	13,448	562,456	2,682	88,650
Ferromanganese.....			13,392	629,865
Ferrosilicon.....	4,487	213,572	6,562	297,912
Ferrochrome.....	546	106,961	867	167,531
Ferrovanadium.....	14	31,630	26	52,483
Other ferro-alloys.....	779	157,339	832	275,555
Scrap iron and steel—Own make.....	265,351		327,606	
Purchased.....	428,638	5,007,161	568,636	8,371,995
Metals for making alloy steels—Nickel.....	262	136,715	360	245,608
Other metals.....	397	98,332	517	193,478
Total metals.....		6,437,338		11,103,364
(b) Ores:—				
Crude iron ore, imported.....	64,678	293,282	86,169	434,120
Calcined, roasted, or treated ore, imported.....	29	264	85	837
Manganiferous ore, imported.....	159	2,276	352	4,949
Chrome ore, imported.....	324	9,965	579	20,602
Total ores.....	65,190	305,787	87,165	460,508
(c) Other Materials:—	Short tons		Short tons	
Limestone—Canadian.....	42,556	70,716	96,010	135,697
Foreign.....	66,644	60,677	29,912	24,733
Fluorspar.....	7,942	88,403	9,039	139,181
Dolomite.....	43,562	145,502	53,066	181,146
Magnesite.....	6,432	230,656	8,994	326,091
Coke.....	2,412	22,919	4,517	38,190
Anthracite coal.....	296	2,585	384	3,296
Bituminous coal.....	200	1,600	264	1,913
Charcoal.....	155	3,639	27,301	6,194
Electrodes.....		154,727		226,128
Moulding sands.....	21,630	109,914	35,224	192,714
Sand-blast sand.....	1,790	11,228	1,791	14,796
Firebrick and fireclay.....		499,598		638,326
Other materials.....		626,783		1,314,435
Total Other Materials.....		2,028,947		3,242,840
Total value of metals, ores and other materials used.....		8,772,072		14,806,712

Table 170.—Summary of Steel Furnace Capacity in Canada, 1937

Type of furnace	Number of furnaces	Total rated annual capacity
		(Long tons)
Basic open hearth.....	41	1,828,000
Electric.....	41	235,800
Converter.....	3	3,800
Total.....	85	2,067,600

Table 171.—World Production of Pig-Iron and Ferro-Alloys, 1935-1937

(Supplied by the Imperial Institute)

(Long tons)

Producing Country	1935	1936	1937	Producing Country	1935	1936	1937
BRITISH EMPIRE				FOREIGN COUNTRIES—Con.			
United Kingdom.....	6,424,100	7,721,400	8,493,100	Netherlands.....	249,610	270,542	306,849
Union of South Africa.....	170,746	198,994	271,887	Norway.....	128,686	164,714	178,375
Canada.....	656,491	754,515	980,927	Poland.....	387,873	575,152	712,857
India.....	1,466,044	1,543,319	1,629,301	Roumania.....	80,694	95,562	125,226
Australia (b).....	698,493	783,233	947,948	Spain.....	349,172	276,500	190,000
New Zealand.....	4,902			Sweden.....	602,001	621,231	680,721
Total.....	9,400,000	11,000,000	12,300,000	U.S.S.R.....	12,291,700	(e)14,316,300	(e)14,291,000
FOREIGN COUNTRIES				Yugoslavia.....	21,215	43,751	39,291
Austria.....	190,119	244,192	381,479	Belgian Congo.....			556
Belgium.....	2,981,752	3,111,411	3,743,675	Mexico.....	63,126	86,642	88,300
Czechoslovakia.....	798,130	1,121,883	1,648,609	United States.....	21,372,699	31,029,187	37,127,277
Finland.....	10,861	12,900	(a)	Brazil.....	63,070	77,179	96,552
France—				Japan.....	1,933,579	2,039,708	2,758,858
Saar.....	(c)297,422			Korea.....	241,323	213,328	
Other districts.....	5,698,338	6,132,019	7,789,211	"Manchoukuo".....	598,346	623,428	(a)
Germany (f).....	12,043,316	15,060,796	15,707,743	Philippine Islands (estimated).....	200	200	200
Hungary.....	182,947	301,452	352,282	Total (d).....	63,900,000	79,300,000	90,200,000
Italy.....	692,718	815,398	860,497	World's Total.....			73,300,000
Luxemburg.....	1,842,800	1,955,229	2,472,814			90,300,000	102,590,000

(a) Information not available.

(b) Years ended June 30.

(c) January-February 17 only, after which date production is included with that of Germany.

(d) Including an allowance for China.

(e) Excluding ferro-alloys.

(f) Including production of the Saar from February 18, 1935.

Table 172.—World Production of Steel Ingots and Castings, 1935-1937

(Supplied by the Imperial Institute)

(Long tons)

Producing Country	1935	1936	1937	Producing Country	1935	1936	1937
BRITISH EMPIRE				FOREIGN COUNTRIES—Con.			
United Kingdom.....	9,858,700	11,784,600	12,984,000	Italy.....	2,177,163	1,993,521	2,065,582
Union of South Africa.....	185,100	244,200	279,700	Latvia.....	2,111	2,554	2,855
Canada.....	941,527	1,115,779	1,402,882	Luxemburg.....	1,807,821	1,949,766	2,470,588
India.....	862,344	865,770	895,229	Poland.....	929,670	1,122,512	1,428,023
Australia (c).....	696,861	(a)	1,097,639	Roumania.....	209,721	216,606	235,495
Total.....	12,500,000	14,700,000	16,650,000	Spain.....	576,923	463,583	165,354
FOREIGN COUNTRIES				Sweden.....	882,237	961,922	1,088,141
Austria.....	358,246	411,790	639,457	U.S.S.R.....	12,209,000	16,338,200	17,149,000
Belgium.....	2,974,803	3,118,340	3,801,586	Mexico.....	(a)	133,418	(a)
Czechoslovakia.....	1,159,872	1,514,014	2,278,000	United States (d).....	34,092,594	47,767,856	50,568,701
France—				Brazil.....	63,217	72,504	75,223
Saar.....	(e)318,438			Japan.....	4,628,315	5,140,527	5,719,488
Other districts.....	6,156,201	6,580,128	7,794,997	Korea.....	95,885	85,640	
Germany (f).....	15,889,216	18,459,495	19,050,372	"Manchoukuo".....	134,656	338,617	(a)
Hungary.....	434,000	544,000	655,000	Total.....	85,200,000	107,200,000	115,700,000
				World's Total.....			97,700,000
						121,900,000	132,300,000

(a) Information not available.

(c) Years ended June 30.

(d) Excluding steel castings which were produced by companies not manufacturing steel ingots.

(e) January-February 17 only, after which date production is included with that of Germany.

(f) Including production of the Saar from February 18, 1935.

LITHIUM

The principal commercial lithium ores are amblygonite, a fluophosphate of lithium and aluminium; spodumene, a silicate of these two elements, and lepidolite, or lithia mica, also a silicate. The lithia content of these minerals, as mined, commonly ranges around 8 to 9 per cent for amblygonite, 4 to 7 per cent for spodumene, and 3 to 5 per cent for lepidolite. All of the above minerals are known to occur in Canada but there has, as yet, been only a small production, mainly of lepidolite and spodumene. The important deposits are all in Manitoba in the south-eastern part of the province. The first commercial shipment of Canadian lithium ore to be officially recorded was reported during 1937. This production came from deposits located at Bernic Lake, Manitoba, and was valued at \$1,694; the mineral was consigned to the United States for the manufacture of lithium compounds and possibly lithium metal.

The Bureau of Mines, Ottawa, reported that during 1937 a discovery of spodumene was reported near Falcon Lake, 85 miles east of Winnipeg, and 1½ miles from a siding of the Greater Winnipeg Water District Railway. The deposit is stated to carry rich concentrations of spodumene.

Lithium minerals serve as the raw material for the manufacture of lithium chemicals and lithium metal and alloys. Lepidolite, which contains relatively low percentages of lithium, is also used as an ingredient of certain glasses, particularly those of the heat-resistant (pyrex) variety.

Some lepidolites, including that from the Silver Leaf deposit in Manitoba, contain important amounts of the rare elements—rubidium and caesium—and methods of recovering these from lepidolite already treated for removal of its lithium content have recently been investigated.

Most of the present world supply of lithium minerals is drawn from deposits in the United States, Southwest Africa, and France. The newly discovered spodumene deposits in North Carolina are regarded as one of the world's largest potential sources of supply of lithium.

The following table shows the production of lithium mica in the specified countries for 1935, 1936 and 1937.

Table 173.—World Production of Lithium Mica, 1935-1937

(Supplied by the *Imperial Institute*)
(Long tons)

Country	1935	1936	1937
South West Africa.....	489	852	1,030
France.....	350	(a)	(a)
United States (lithium minerals).....	1,030	1,106	1,212
Portugal.....	8		109
Argentina.....		60	(a)

(a) Information not available.

Statistics relating to possible imports of lithium, lithium ores or lithium compounds are not shown separately in Canadian trade reports.

"Metal and Mineral Markets"—New York—published the following quotation, October, 1938—Lithium metal, per pound, 98 to 99 per cent, 100 pound lots, \$15.

In the United States the average values, f.o.b., for domestic ores in 1937 were \$37.63 per ton for amblygonite and \$25 for spodumene. Lepidolite continued to be quoted nominally at \$20 to \$25 per ton.

MAGNESIUM

The rapid development of aviation and the growing importance of the air arm for military purposes has caused the question of magnesium production to be seriously regarded in all the more important countries. The metal is not yet produced commercially in Canada but it is interesting to note that the annual report of the Consolidated Mining and Smelting Company of Canada, Ltd., for 1937, stated that "In all probability the next member of the metal family (of this company) will be magnesium."

The following information relating to magnesium has been abstracted from the Minerals Yearbook of the United States Bureau of Mines: "Sales of primary magnesium in the United States in 1937 were the largest since commercial production began in 1915. All this new metal was produced by the Dow Metal Company of Midland, Michigan. Magnesium sold or used by the producer in the United States totalled 4,539,980 pounds in 1937; the metal produced in the United States is all recovered from Michigan brine wells.

One of the most important consumers of magnesium is the metallurgical industry, which uses it as a scavenger and a deoxidizer in casting nickel, zinc and aluminium alloys. In recent years large gains have been made in the use of magnesium in alloys. Some alloys employ magnesium only as a minor constituent, while others use more than 85 per cent magnesium. The low specific gravity of magnesium (1.74) makes possible production of alloys that are 35 per cent lighter than aluminium yet still have comparable properties.

Aircraft engine and aeroplane manufacturers used increasing quantities of magnesium sand castings in 1937 and consumed approximately 70 per cent of all castings produced.

The United Kingdom and Japan are becoming important producers of magnesium and Italy reported a small output of the metal in 1937. As heretofore, Germany led the world in magnesium production. According to an authoritative estimate, Germany's output was slightly more than 10,000 metric tons in 1937. World production of the metal totalled possibly 18,000 tons in 1937.

The latest method of producing metallic magnesium, the direct thermal-reduction process, gained wide publicity in 1936. The raw material used in this method is dead-burned magnesite which, in the preliminary stages of the process, is reduced to magnesium vapour in an electric furnace.

Data relating to Canadian imports of magnesium metal are not published separately.

Magnesium metal prices were shown by "Metal and Mineral Markets"—New York—for October, 1938, as follows: per pound, ingots (4 x 16 inch), 99.8 per cent, 30 cents in carloads; 32 cents in 100 pound lots or more, l.c.l.

MANGANESE ORE

Mine shipments of manganese ore in Canada during 1937 totalled 85 tons valued at \$817. This ore came entirely from deposits located near Elgin in the province of New Brunswick.

The Department of Mines and Resources, Ottawa, reports that the manganese ores, which have been mined in Canada are pyrolusite, manganite, psilomelane, and bog manganese. These, with the exception of the bog manganese, were mostly ores with a high manganese content and fairly free from deleterious constituents. They were usually in small lots and were derived from various localities in Nova Scotia, New Brunswick and British Columbia.

The exploratory work carried out at New Ross, Lunenburg county, Nova Scotia, by the Atlantic Manganese Corp., Ltd., in 1936 was not continued in 1937.

Although manganese is used in both the ferrous and non-ferrous metallurgical industries, the bulk is consumed in the manufacture of iron and steel. Most of the ore entering this industry is used in the manufacture of ferromanganese and spiegeleisen, the forms in which manganese is usually added to steel. A considerable quantity of manganese ore is used by producers of storage batteries and certain manganese ores are used by the chemical, ceramic, and glass industries.

In 1937 Canada imported 1,544,529 cwt. of manganese oxide valued at \$802,269 compared with 1,285,242 cwt. at \$684,175 in 1936. Of the 1937 imports, 1,274,448 cwt. came from the Gold Coast, 221,760 cwt. from British South Africa, and 46,692 cwt. from the United States.

"Metal and Mineral Markets"—New York—manganese ore quotations, October, 1938, were: per long ton unit of manganese, c.i.f. North Atlantic ports, cargo lots, exclusive of duty: Brazilian, 46 to 48 per cent manganese, 33 cents; Chilian, 47 per cent minimum, 34 cents; Indian, 48 to 50 per cent, 35 cents; Caucasian, 52 to 55 per cent, 35 cents; South African, 50 to 52 per cent, 35 cents. Chemical grades, per ton, coarse or fine, minimum 80 per cent MnO_2 , Brazilian or Cuban, \$45 in carloads to \$50 to \$55 barrelled.

Table 174.—Production of Manganese Ore in Canada, 1924-1937

Year	Tons	Value	Year	Tons	Value
		\$			\$
1924.....	584	4,088	1932-1934.....		
1925-1929.....			1935.....	100	800
1930.....	273	1,356	1936.....	221	1,596
1931.....	117	2,893	1937.....	85	817

Table 175.—Consumption of Manganiferous Ore and Manganese Compounds in Specified Canadian Industries, 1936 and 1937

Industry	Item	1936		1937	
		Quantity	Value	Quantity	Value
			\$		\$
Electrical Apparatus and Supplies....	Manganese dioxide..... pound	3,875,978	69,884	4,207,634	75,970
Paints, Pigments and Varnishes.....	Manganese Salts..... pound	91,698	13,239	55,423	6,322
Steel Ingots and Castings.....	Ore manganiferous (foreign) pound	356,160	2,276	664,000	4,949
	Spiegeleisen.....long ton	13,448	562,456	2,682	88,650
	Ferromanganese.....long ton			13,392	629,865

Note.—In addition to the consumption recorded in the table above, a considerable quantity of manganiferous ore is employed in the manufacture of ferro-alloys.

Tabel 176.—World Production of Manganese Ore, 1935-1937

(Supplied by the Imperial Institute)

(Long tons)

Producing Country	1935	1936	1937	Estimated Manganese Content		
				1935	1936	1937
BRITISH EMPIRE						
Gold Coast (shipments).....	430,659	411,024	527,036	224,000	214,000	274,000
Northern Rhodesia.....	3,976	3,022	2,341	1,407	774	646
Union of South Africa.....	93,943	254,167	621,229	47,253	119,214	264,581
Canada.....	89	197	76	(a)	(a)	(a)
India.....	641,483	813,442	1,051,594	321,000	407,000	526,000
Unfederated Malay States.....	28,054	36,776	32,793	8,800	10,900	9,900
Australia.....	148	72	1,142	(a)	(a)	(a)
New Zealand.....			5			2
Total.....	1,200,000	1,520,000	2,240,000			
FOREIGN COUNTRIES						
Bulgaria.....		2,500	3,000		1,000	1,200
Czechoslovakia.....	70,306	91,567	104,664	11,995	15,489	17,641
Germany.....	220	238	177	92	99	74
Greece.....	416	1,653	6,842	200	578	3,585
Hungary.....	6,192	26,798	24,691	2,167	11,100	9,900
Italy.....	8,983	23,751	33,002	2,650	8,450	11,800
Portugal.....	156	285	312	66	114	135
Roumania.....	19,482	33,321	49,997	5,800	10,000	15,000
Spain.....	1,240	(a)	(a)	400	(a)	(a)
Sweden.....	7,114	6,259	6,031	2,661	2,253	2,091
U.S.S.R.....	2,346,900	2,955,000	(a)	(a)	(a)	(a)
Yugoslavia.....	913	2,696	4,369	300	1,000	1,500
Belgian Congo.....			30,498			15,249
Egypt.....	85,924	132,840	183,377	25,087	38,524	53,179
Morocco (French).....	24,479	29,412	75,257	10,500	14,000	35,000
Morocco (Spanish).....			650			(a)
Cuba.....	(b) 90,650	(b) 151,981	130,000	17,223	30,000	60,000
Mexico.....	3,166	3,284	17	(a)	(a)	(a)
Porto Rico (exports).....	3,358	3,010	2,343	1,679	1,505	1,171
United States (c).....	26,428	32,119	40,241	11,400	13,800	20,800
Argentina.....	432	436		180	180	(a)
Brazil.....	(d) 59,711	(d) 163,842	256,054	28,100	77,000	120,000
Chile.....	4,301	5,098	12,809	2,002	2,286	5,764
China.....	1,000	(a)	(a)	460	(a)	(a)
French Indo China.....	1,543	3,375	5,207	643	1,588	2,300
Japan.....	70,527	66,683	(a)	35,000	33,000	(a)
Netherlands East Indies.....	12,158	8,483	10,908	6,286	4,500	6,000
Philippine Islands.....	(d) 511	200	5,600	245	100	2,700
Portuguese India.....	4,000	2,579	4,013	1,800	1,150	1,766
Turkey.....	15,350	5,100	522	7,368	1,200	130
Total.....	2,900,000	3,800,000	(a)			
World's Total.....	4,100,000	5,300,000	(a)			

(a) Information not available.

(b) Low grade ore before concentration.

(c) Shipments. Excluding the following quantities of ore containing 10 to 35 per cent. Mn, which are recorded by the United States Bureau of Mines as iron ore:—

1935.....	93,291 long tons.
1936.....	98,962 “ “
1937.....	151,955 “ “

(d) Exports.

MERCURY

There has been no Canadian production of new mercury reported since 1897. Previous to this a small output of quicksilver was recorded as having been produced in British Columbia from a property situated on the north shore of Kamloops Lake. Cinnabar occurs on the property of the Manitou Mining Co. Ltd. located in the Mud Creek area of the Lillooet mining division in British Columbia; the mineral is found here in sheared greenstone or in massive amygdaloidal greenstone. This mine is located at the confluence of Mud and Relay Creeks and is about 17 miles from Minto. Much work has been done by open-cuts and over 2,000 feet of underground prospecting to determine the tonnage of cinnabar available. Twenty-five men were employed during 1937.

According to the United States Bureau of Mines, producing countries—notably Italy and the United States—prepared to meet the increasing demands for mercury by speeding production. Italy made a new all-time high record output of nearly 67,000 flasks (76 lb. each). Activity at mines in the United States was at a high rate in the first half of 1937 followed by a drastic drop towards the latter part of the year. Despite concern that Spanish supplies would be cut off entirely by civil war in that country and that Italy would be unable to make up for the reduced shipments from Spain, the threatened shortage of mercury failed to materialize.

Imports of mercury into Canada during 1937 totalled 394,354 pounds valued at \$371,178; of this, 101,483 pounds came from the United States and 150,477 pounds from Italy. Imports in 1936 amounted to 78,781 pounds at \$66,511. Mercury salts imported during 1937 were valued at \$9,681 compared with \$4,719 in the preceding year.

Quicksilver quotations, New York, January, 1938, per flask of 76 pounds, ranged from \$79.50 to \$81.00.

Table 177.—Imports into Canada of Mercury, 1928-1937

Year	Quantity	Value	Year	Quantity	Value
	Pounds	\$		Pounds	\$
1928.....	199,603	269,746	1933.....	49,066	35,057
1929.....	346,701	478,048	1934.....	246,892	183,366
1930.....	105,755	153,837	1935.....	121,471	98,871
1931.....	21,159	24,454	1936.....	78,781	66,511
1932.....	43,230	37,068	1937.....	394,354	371,178

Table 178.—Mercury Consumed in Specified Canadian Industries, 1936 and 1937

Industry	1936		1937	
	Pounds	Value	Pounds	Value
		\$		\$
Boiler compounds.....	1,050	970	300	304
Medicinal and pharmaceutical preparations.....	90,662	75,319	44,574	41,399
Other chemicals.....	47,385	41,126	55,994	47,552

Note.—In addition to the consumption specified, there is a considerable quantity of quicksilver employed by the mining industry in the recovery of both placer and lode gold.

Table 179.—World Production of Mercury, 1935-1937

(Supplied by the Imperial Institute)

(Lb.)

Producing Country	1935	1936	1937	Producing Country	1935	1936	1937
BRITISH EMPIRE				FOREIGN COUNTRIES—Con.			
Australia.....	1,299	5,911	710	Algeria.....		8,823	9,429
New Zealand.....	563		1,344	Tunis.....	1,764	5,470	1,911
FOREIGN COUNTRIES				Mexico.....	477,067	408,355	375,132
Austria.....	900	220	(a)	United States.....	1,331,368	1,259,244	1,254,608
Czechoslovakia.....	152,379	142,546	208,989	Bolivia (exports).....	32,040	16,885	1,323
Germany (Hg content of ore).....	8,800	(a)	(a)	China (exports).....	99,808	189,928	131,925
Italy.....	2,143,000	3,247,000	4,868,000	Japan.....	11,219	32,571	(a)
Roumania.....	29	179	(a)	Korea.....	306	157	(a)
Spain (b).....	2,702,500	3,220,000	3,200,000	Turkey.....	1,929	63,504	37,269
				World's Total.....	6,960,000	8,600,000	10,100,000

Quicksilver is also produced in U.S.S.R.

(a) Information not available.

(b) Figures for 1936 and 1937 are the amounts imported from Spain by the chief consuming countries.

MOLYBDENITE

Molybdenite is the principal ore from which the metal molybdenum is reduced. It usually occurs in pegmatite dykes and on the contacts of limestone and gneiss. Molybdenum is employed chiefly for the manufacture of special alloy steels, the characteristics of which include their power to withstand high temperatures and pressures, corrosion and fatigue. The United States has produced 75 to 90 per cent of the world's supply of new molybdenum during recent years; the relatively small quantities produced in other countries come largely from Mexico and Norway; Chosen, Morocco, Peru, and Australia are other producers.

The first commercial shipments of Canadian molybdenite concentrates since 1931 were made during 1937. These totalled approximately 8 tons valued at \$8,147 and were produced by the Phoenix Molybdenite Corporation, Ltd.; the property of this company is located in Bagot township, Renfrew county, Ontario, and the production reported in 1937 was exported for treatment to foreign plants. In the same county the McCoy Molybdenite Company conducted prospecting on a property located in Lyndoch township. Near Schreiber, Thunder Bay district, work was carried on at the Owl Lake property. The Molydor Mines Ltd. prospected a property north of Loon station, east of Port Arthur, and it was reported that a 40 ton mill was planned by this company. At Mace, near Cochrane, some work was done on the deposit of the Duke Molybdenite Mining Syndicate.

In Quebec, prospecting was carried out in 1937 by J. B. Gratton on molybdenite deposits located in Gaudette township. On the Bain property in Masham township a small flotation test mill was erected by Kindall Mines Ltd. and in La Reine township, Abitibi district, considerable work was conducted on molybdenite bearing quartz veins by La Reine Gold Mines Ltd. During 1937 diamond drilling and assessment work were carried on by the Molybdenite Corporation of Canada on a property in LaCorne township.

According to a report issued by the Bureau of Mines, Ottawa, prospecting was carried out by several parties in South Eastern Manitoba and in British Columbia a small sample shipment of molybdenite ore was shipped from a property at Martel to the Government Testing Laboratories, Ottawa. The Consolidated Mining and Smelting Company of Canada, Limited, investigated several molybdenite properties in 1937.

No imports of crude molybdenite ore into Canada were recorded in either 1936 or 1937. Imports of calcium molybdate when imported by Canadian manufacturers of steel for use exclusively in the manufacture of steel, in their own factories, totalled 212,566 pounds valued at \$70,337 in 1937 compared with 158,621 pounds at \$60,363 in 1936; imports during both years came entirely from the United States.

Molybdenite (MoS_2) is usually converted, before using, to ferromolybdenum, an electric furnace product carrying 60 to 65 per cent molybdenum, or to calcium molybdate, containing 35 to 45 per cent molybdenum.

Molybdenum ore was quoted in the United States, October, 1938, per pound of contained MoS_2 , 90 per cent concentrate, 45 cents, f.o.b. mines. London, per long ton unit, nominal at 42s. to 43s. for 90 per cent concentrate.

Table 180.—Production of Molybdenite in Canada, 1925-1937

Year	Ores treated	Ores and concentrates shipped		MoS ₂ content of shipments
	Tons	Tons	Value (a)	Pounds
			\$	
1925.....	2,779	15.3	11,176	22,350
1926.....	4,490	12.6	10,472	20,943
1927.....				
1928.....				
1929.....	2,900	9.5	6,400	16,150
1930.....				
1931.....	12	0.61	280	1,222
1932-1936.....				
1937.....	5,307	8.25	8,147	(b)

(a) Value as given by the operator.

(b) Not known.

Table 181.—World Production of Molybdenum Ore, 1935-1937

(Supplied by the Imperial Institute)

(Cwt.).

Producing Country	1935	1936	1937	Producing Country	1935	1936	1937
BRITISH EMPIRE				FOREIGN COUNTRIES—Con.			
Canada.....			147	French Morocco (<i>MoS₂ content</i>).....	2,330	3,800	3,200
Burma.....			14	Mexico.....	22,528	17,522	20,655
Australia.....	212	403	1,400	United States (<i>MoS₂ content</i>).....	171,310	255,744	437,783
FOREIGN COUNTRIES				Peru (<i>MoS₂ content</i>).....	194	387	1,629
Roumania (<i>Bi-Mo Ore</i>).....	280	900	530	Japan.....	127	120	(a)
Yugoslavia.....	363			Korea.....	2,077	1,573	(a)
Norway (<i>MoS₂ content</i>).....	12,736	13,838	11,279	Turkey.....			42

Molybdenum ore is also produced in China.

(a) Information not available.

RADIUM-URANIUM

Commercial production of radium-uranium bearing ores in Canada comes, at the present time, entirely from the Great Bear Lake district in the Northwest Territories. Eldorado Gold Mines Ltd. operates a mine and mill at Echo Bay, Great Bear Lake, Northwest Territories, and was the only Canadian producer of pitchblende ores during 1937. Pitchblende concentrates produced by this company are treated for the recovery of radium and uranium at a refinery owned and operated by the company at Port Hope, Ontario. Important quantities of silver also occur with the pitchblende at the Eldorado mine and this metal, in the form of silver concentrates, is principally shipped to the metallurgical works of other firms for the recovery of the silver content.

During 1937 there were hoisted at the Eldorado mine, 25,486 tons of ore. Concentrates produced, including cobbed, totalled 674.5 tons, comprising 475.3 tons pitchblende-silver; silver-copper (flotation), 193.3 tons; cobalt (cobbed), 5.9 tons.

At Port Hope, Ontario, a new chemical plant for the recovery of radium in the form of radium-barium sulphate concentrate and silver in the form of silver sulphide was erected by Eldorado Gold Mines Ltd. Chemical operations by the company were limited to nine months in 1937, the old plant being operated to full capacity up to October 1. At that date it was necessary to cease all chemical treatment for transfer of the equipment from the old plant to the new. The ore shipments received at the plant from the mine in 1937 amounted to 339 tons. The roasting and milling plant treated 294 tons of ore and produced 302 tons of roasted ore ready for chemical treatment. From the 302 tons of ore obtained after roasting and milling, 290 tons were used during the year, and entered into the chemical treatment for the recovery of silver, radium and uranium. Treatment for the silver was fully completed on the 290 tons entered; for uranium, 287 tons, and for radium, 305 tons, which includes some of the ore in course of finishing at the beginning of the year. Recovery for both radium and uranium was about 90 per cent and for silver about 96 per cent. At current market values, the total production of finished products of radium, uranium and silver, amounted to \$850,000.00. All silver produced during the year was in the form of silver sulphide which was disposed of entirely in the United States for silver refineries. During the year a certain amount of lead contained in the ore was recovered chemically in the form of lead sulphate, to meet the demand for radio-active lead as a source of radium D.

For statistical purposes, the data relating to the mining and milling and the refining of pitchblende-silver ores in Canada are combined, respectively, with those of silver-lead-zinc mining and non-ferrous smelting industries. Figures pertaining to production of radium and uranium in Canada are not published.

The Union Minière du Haut Katanga is the world's other large producer of radium but little information is available regarding the mining of radium ores by this organization in the Belgian Congo or to the refining operations conducted at Oolen, Belgium.

According to the United States Bureau of Mines, radium, aside from its therapeutic uses, is being employed more extensively by physical metallurgists for inspecting flaws in metal castings. Additional quantities are used in luminous paints and for radioactive soaps, pads, tablets and toilet preparations.

The chief use for uranium is in the form of sodium uranate used in the ceramic industry for colouring glass and porcelain yellow. By using the black oxide, red and black colorations likewise can be made. It is stated that about 5.2 tons of uranium salts are recovered per gram of radium.

Imports of radium into Canada during 1937 were valued at \$6,402 compared with \$109,032 in 1936. Data relating to possible imports of uranium salts are not published.

Table 182.—World Production of Uranium Minerals, 1935-1937

(Supplied by the *Imperial Institute*)

(Cwt.)

Producing Country	1935	1936	1937	Producing Country	1935	1936	1937
BRITISH EMPIRE				FOREIGN COUNTRIES			
Canada.....	(b)	(b)	(b)	Czechoslovakia (U_3O_8)....	311	316	217
				Portugal (U_3O_8).....	23	211	(c)
				Belgian Congo.....	250	(a)	(a)
				United States (U_3O_8).....	232	189	(a)

Uranium minerals are also produced in U.S.S.R.

(a) Information not available.

(b) The production of radium and uranium salts were:—

	Radium mgrams.	Uranium salts Lb.
1935.....	85	160,662
1936.....	15,541	211,857
1937.....	23,770	546,000

(c) The content of radium in salts was 2,900 mgrams.

SELENIUM

Selenium production in Canada represents a by-product in the electrolytic refining of blister copper made from Saskatchewan, Manitoba, Ontario and Quebec ores. It is recovered at Copper Cliff, Ontario, by the Ontario Refining Company, Ltd., and at Montreal East, Quebec, by the Canadian Copper Refiners, Ltd.

Production of selenium in Canada during 1937 totalled 397,227 pounds valued at \$687,203 compared with 350,857 pounds at \$621,017 in 1936. Of the 1937 output, 208,531 pounds were recovered from Quebec copper-gold ores, 116,696 pounds from Ontario nickel-copper ores, 43,920 pounds from Manitoba copper-gold ores, and 28,080 pounds from copper-gold ore mined in that part of the Flin Flon mine located on the Saskatchewan side of the Manitoba-Saskatchewan boundary.

One of the principal uses for selenium is as a decolorizer in the manufacture of glass. It is used with cadmium sulphide as a pigment and with sulphur as a secondary vulcanizing agent in the rubber industry. Selenium is used in copper alloys and stainless steel to increase machinability. Selenium is marketed chiefly as a black to steel-gray amorphous powder, also in cakes and sticks.

General statistics on employment, etc., as relating to the production of both selenium and tellurium are included with those compiled for the Canadian non-ferrous smelting and refining industry. Figures pertaining to Canadian imports and exports of selenium are not published separately.

Selenium was quoted, New York, October, 1938, per pound, \$1.75 for black, powdered, 99.5 per cent pure.

Table 183.—Production of Selenium in Canada, 1932-1937

Year	Pounds	\$	Year	Pounds	\$
1932.....			1935.....	366,425	703,536
1933.....	48,221	70,345	1936.....	350,857	621,017
1934.....	104,924	171,311	1937.....	397,227	687,203

In 1937 the Canadian glass industry consumed 4,116 pounds of selenium valued at \$7,565.

Selenium production in the United States in 1937 was 435,821 pounds compared with 352,480 pounds in 1936.

TANTALUM-COLUMBIUM

Neither tantalum nor columbium ores are produced in Canada. However, it is interesting to note that the Department of Mines and Resources, Ottawa, reports that columbite-tantalite has been found in small quantities in a number of feldspar mines in the Dominion.

It has been recently reported that the demand for both columbite and tantalite continues generally active and has become world-wide. Nigeria has been the principal producer of columbite and Australia of tantalite and, according to the United States Bureau of Mines, the United States has taken most of the output of both countries, while its own small production sought markets abroad because American consumers were not interested in purchasing mixtures containing relatively large proportions of both metals. Imports of columbium ore into the United States in 1937 aggregated 461 short tons valued at \$306,086, all from Nigeria except 540 pounds worth \$245 from Brazil. Tantalum ore imported into the United States in the same year was 20,897 pounds valued at \$40,742, all from Australia. No imports of either columbium or tantalum into Canada were reported in 1937.

Tantalum is strongly resistant to acid corrosion, is weldable and easily fabricated. It is used in chemical process equipment and electronic tubes. Due to its hardness and high melting point, tantalum carbide is a constituent of hard cutting-tool mixtures. Ferrocolumbium has become an important alloy for the manufacture of weldable high-speed steels. Columbium metal has also been employed in the construction of electronic tubes.

TELLURIUM

As with selenium, the metal was recovered in Canada as a by-product in the electrolytic refining of blister copper at Montreal East, Quebec, by Canadian Copper Refiners, Limited, and at Copper Cliff, Ontario, by the Ontario Refining Company, Limited. The production in Ontario represents the recovery of the metal solely from nickel-copper ores, whereas at Montreal East the metal originated in the copper-gold ores mined in Manitoba, Saskatchewan and Quebec.

Production of tellurium in Canada during 1937 totalled 41,490 pounds valued at \$71,777; of this output, 26,439 pounds were credited to the province of Quebec, 6,651 pounds to Ontario, 5,124 pounds to Manitoba, and 3,276 pounds to Saskatchewan.

The United States Bureau of Mines states that a wider use of tellurium lead is reported, both in the United States and abroad, but the amount of tellurium required to harden, toughen and increase the corrosion resistance of lead is so small (0.02 to 0.085 per cent) that 50 to 75 tons of tellurium annually would treat all the lead used in the United States for chemical plants and suffice for general building construction as well.

Tellurium is used in rubber hose and cable coverings and greatly increases the toughness and abrasion resistance of rubber. Tellurium is usually marketed as slabs and sticks of 99 per cent purity, but for use in compounding rubber it is furnished in the form of a steel gray powder.

Production of tellurium in the United States in 1937 totalled 51,409 pounds and the New York quotation in October, 1938, was \$1.75 per pound.

Data relating to Canadian imports and exports of tellurium are not shown separately in the trade reports of the Dominion.

Table 184.—Production of Tellurium in Canada, 1934-1937

Year	Pounds	\$	Year	Pounds	\$
1934*	5,130	25,599	1936	35,591	62,997
1935	16,425	32,850	1937	41,490	71,777

*First commercial production in Canada.

TIN

Tin is known to occur in the Snowflake and Sullivan mines in British Columbia and in certain pegmatites in southeastern Manitoba. It has also been reported at New Ross, Nova Scotia. No tin ore deposits have been worked or tin ore production recorded in Canada during recent years.

The Tin Producers' Association, London, announced that the International Tin Control scheme as renewed on January 1, 1934, expired on December 31, 1936. It was renewed in a revised form and the new agreement, which now remains in force until December 31, 1941, was set out by the International Tin Committee in a document, January 5, 1937.

In the new agreement, standard tonnages for the various signatory countries are laid down as follows:

Belgian Congo.....	13,200
Bolivia.....	46,490
French Indo-China.....	3,000
Malaya.....	71,940
Netherlands East Indies.....	36,330
Nigeria.....	10,890
Siam.....	18,000
Total.....	199,850

By a supplementary agreement, a slight variation is made in these figures.

Table 185.—Imports of Tin into Canada, 1936 and 1937

Item	1936		1937	
	Pounds	\$	Pounds	\$
Tin in blocks, pigs or bars.....	4,846,800	2,182,419	5,879,800	3,115,643
Tin foil.....	68,820	26,533	63,683	26,148
Collapsible tubes.....	185,579	63,829	36,830	36,830
Tin bichloride and tin crystals.....	46,644	46,644	272,398	72,590
Oxide of tin and copper.....	219,405	77,080	351,239	121,523
Phosphor tin and phosphor bronze in blocks, bars, plates, etc.....	934,381	240,272	1,432,245	440,556
Tin plate food containers.....		201,679		279,925
Tin plate containers, n.o.p.....		383,981		408,699
Sheets, plate, hoop, etc., tin coated.....	188,611,300	9,184,222	233,602,200	13,699,442

Table 186.—Available Statistics on the Consumption of Tin in Specified Canadian Manufacturing Industries, 1935-1937

Industry	Item (used)	1935	1936	1937
		Pounds	Pounds	Pounds
Brass and Copper Products.....	Ingots.....	254,132	276,414	384,685
	Scrap.....	26,954	12,290	7,540
	Other.....	33,681	3,533	2,774
White Metal Alloys.....	Pig.....	2,898,077	2,940,320	3,207,124
Iron and Steel and Their Products.....	Tin.....	929,373	984,865	974,562

* Includes castings and forgings; boilers, tanks and engines; farm implements; machinery; hardware and tools; sheet metal products; wire; railway rolling stock; heating and cooking apparatus; automobile parts, etc.

Table 187.—World Production of Tin Ore, 1935-1937

(In terms of metal)
(Supplied by the Imperial Institute)
(Long tons)

Producing Country	1935	1936	1937	Producing Country	1935	1936	1937
BRITISH EMPIRE				FOREIGN COUNTRIES			
United Kingdom.....	2,050	2,099	1,987	Germany.....	25	50	(a)
Nigeria.....	6,299	9,648	10,782	Portugal.....	730	823	1,095
Northern Rhodesia.....	5	5	5	Belgian Congo.....	6,132	7,303	8,133
Southern Rhodesia.....	7	47	139	Cameroon (French).....	216	216	258
South West Africa.....	164	162	169	Morocco (French).....	38	22	14
Swaziland.....	127	128	108	Mozambique.....	7	15	(a)
Tanganyika Territory.....	145	207	243	Mexico.....	621	368	373
Uganda.....	397	409	361	United States.....	45	101	145
Union of South Africa.....	622	634	537	Argentina.....	700	940	2,200
Burma.....	4,102	4,546	4,636	Bolivia (exports).....	25,002	24,091	25,127
Federated Malay States (shipments).....	40,749	64,719	75,393	China (smelter).....	9,700	10,400	11,100
Unfederated Malay States.....	1,542	1,979	2,075	French Indo-China.....	1,310	1,381	1,577
Straits Settlements.....	52	58	72	Japan.....	2,202	2,300	2,300
Australia.....	3,130	3,361	3,607	Netherlands East Indies... ..	20,141	30,769	39,165
				Siam (exports).....	9,737	12,526	15,985
Total.....	59,400	88,000	100,100	Total.....	77,000	91,000	107,500
				World's Total.....	136,000	179,000	208,000

NOTE.—In the case of countries for which assay figures are not published the metal content of the ores has been estimated on the following percentages—South West Africa 70, Swaziland, 70, Uganda, 70, Burma 70, Belgian Congo 70, Japan 70, Siam 70.

(a) Information not available.

TITANIUM

Ilmenite, the titanium ore so largely employed in the manufacture of pigments, is known to occur at several places in Canada and commercial shipments of the mineral have been made during past years from deposits located at St. Urbain and Ivry in the province of Quebec. During 1937, Canadian production came entirely from St. Urbain, Quebec, and totalled 4,229 short tons valued at \$26,432; the mineral was consigned to firms manufacturing ferro-alloys.

In 1937 a new company, Titanium Products Corporation, shipped a small quantity of titanium ore to Montreal from its property located in Bourget-St. Charles, Chicoutimi county, Quebec. The material was in the nature of samples and was utilized for laboratory purposes.

According to the Minerals Yearbook of the United States Bureau of Mines, the world production of ilmenite in 1937 totalled some 225,000 tons. This ore would yield 100,000 tons of titanium pigment, 75,000 tons of which would normally be made in the United States, where further quantities of ilmenite are used in making ferrocantitanium and other alloys and compounds. World production of rutile has grown to around 3,000 tons annually and is used principally in welding-rod coatings. Ilmenite for making white pigments has come mostly from two places on the southwestern shores of India, the beaches at Manavalakurichi and Quilon in Travancore having supplied more than 700,000 tons so far.

Industrial and Engineering Chemistry reports—"The most important titania colour, however, is a recently discovered pigment consisting of chromium, antimony and titania. This strong and inert pigment is rich yellow in colour, and 2 to 3 per cent is sufficient to obtain a strong yellow coloured pottery body".

No imports of crude titanium ore into Canada were reported in 1937. Imports into Canada of antimony oxide, titanium oxide and white pigments containing not less than 14 per cent by weight of titanium totalled 5,630,451 pounds valued at \$526,745 in 1937 compared with 4,198,017 pounds at \$424,451 in 1936.

New York quotations for titanium ore, October, 1938, per gross ton, were: ilmenite, 45 to 52 per cent TiO_2 , f.o.b. Atlantic seaboard, \$10 to \$12, according to grade and impurities. Rutile, per pound, guaranteed minimum 94 per cent concentrate, 10 cents, nominal; 88 to 90 per cent, \$55 per ton, c.i.f. New York. Ferrocantitanium, per ton, \$142.50, f.o.b. producer's plant.

Table 188.—Production of Titanium Ore in Canada*, 1927-1937

Year	Short ton	\$	Year	Short ton	\$
1927.....	2,029	8,980	1933.....		
1928.....	2,244	6,732	1934.....	2,023	14,161
1929.....	2,748	7,359	1935.....	2,288	16,401
1930.....	412	1,239	1936.....	2,566	18,318
1931.....	1,509	10,261	1937.....	4,229	26,432
1932.....					

* All from Quebec.

Table 189.—Consumption of Titanium Pigments in Canadian Paint Industry, 1931-1937

Year	Pounds	Cost at works	Year	Pounds	Cost at works
		\$			\$
1931.....	745,207	89,761	1935.....	2,513,026	261,506
1932.....	691,304	96,759	1936.....	2,456,265	269,130
1933.....	1,061,249	128,969	1937.....	3,748,341	362,869
1934.....	1,710,188	186,678			

1936 figures include 1,396,337 pounds of pure titanium white valued at \$193,638 and the 1937—1,299,857 pounds valued at \$193,107.

NOTE.—Neither titanium white nor titanium alloys are commercially produced in Canada.

Table 190.—World Production of Titanium Minerals, 1935-1937

(Supplied by the Imperial Institute)

(Long tons)

Producing Country and Description	1935	1936	1937	Producing Country and Description	1935	1936	1937
BRITISH EMPIRE				FOREIGN COUNTRIES			
South West Africa—				Norway—			
Rutile.....		54	16	Ilmenite.....	37,384	66,133	66,270
Canada (shipments)—				Rutile.....	122	195	184
Titaniferous iron ore.....	2,043	2,291	3,776	Portugal—			
Federated Malay States				Ilmenite.....	260	521	1,433
(exports)—				Cameroon (French)—			
Ilmenite.....	2,500	10,314	6,252	Rutile.....	44	54	101
India—				Egypt.....	180	24	315
Ilmenite.....	127,051	140,477	181,047	Senegal—			
Australia—				Ilmenite.....	3,750	3,850	3,026
Ilmenite.....	(b)	(b)	670	Brazil (exports)—			
Rutile.....	(b)	(b)	1,123	Ilmenite.....	282	9	230
Rutile-ilmenite.....	(b)	(b)	72	Rutile.....		710	644

NOTE.—Titanium minerals are also produced in the United States, but figures are not available for publication. In recent years, however, the production of ilmenite has varied between 1,000 and 5,000 tons, and the production of rutile has been several hundred tons.

(a) Information not available.

(b) Zircon-rutile-ilmenite sands were produced in New South Wales, but only the zircon was recovered.

TUNGSTEN

The Bureau of Mines, Ottawa, states that occurrences of tungsten-bearing minerals, usually in the form of scheelite, are known in Nova Scotia, New Brunswick, Manitoba, British Columbia, and in the Yukon Territory. There has been no production of tungsten in Canada, with the exception of a few hundred tons of concentrate produced between 1912 and 1917.

In Nova Scotia, during 1937, the Indian Path Tungsten Mines Limited carried out a small amount of work on their property at Indian Path, Lunenburg county. This work consisted of unwatering all the shafts and underground workings and properly sampling the same. Some work was also done in 1937 on a deposit of scheelite occurring at Lower Sackville and the old Cobequid Road in Halifax county.

Throughout most of 1937, Columbia Tungstens Co. Ltd. operated its mine located near Wells, British Columbia. This company erected a small mill and mined and treated some 100 tons of ore for experimental purposes; approximately two tons of scheelite concentrates were produced.

The principal use for tungsten is in the manufacture of high-speed tool steels. It is also employed in certain non-ferrous alloys and special alloy steels. Tungsten carbide cemented with cobalt is used extensively in industry and recent developments include several special grades, including combinations of tungsten carbide and tantalum carbide cemented with cobalt or nickel or both, also combinations of tungsten carbide and titanium carbide cemented with cobalt. Tungsten is also utilized in the making of lamp filaments, radio tube filaments and contact points in electrical apparatus; in the chemical industry it is employed in the manufacture of certain types of dyes (lakes) and mordants.

China has been the principal world producer of tungsten ores and in 1937 the demand for such ores was intensified by the Japanese invasion of China. London prices for Chinese wolframite concentrates containing 65 per cent WO_3 reached their highest point in mid-September when quotations per long ton unit of WO_3 , c.i.f., were 125s. to 130s. At the close of 1937 quotations for United States scheelite per short ton unit of WO_3 were \$22 to \$25.

Table 191.—Tungsten Wire Used in the Manufacture of Canadian Electrical Apparatus and Supplies, 1931-1937

Year	Value	Year	Value
	\$		\$
1931.....	79,659	1935.....	52,192
1932.....	53,802	1936.....	47,856
1933.....	48,701	1937.....	52,768
1934.....	48,996		

Table 192.—World Production of Tungsten Ore and Concentrates, 1935-1937

(Supplied by the *Imperial Institute*)

(Long tons)

Producing Country	1935	1936	1937	Estimated WO ₃ Content		
				1935	1936	1937
BRITISH EMPIRE						
United Kingdom—						
Concentrates.....	219	189	127	151	130	83
Nigeria—						
Concentrates.....	15	6	8	9	4	5
South West Africa—						
Wolfram.....	42	38	28	25	27	19
Scheelite.....	2	2	9	1	1	5
Southern Rhodesia—						
Concentrates.....	24	94	246	16	61	160
Tanganyika Territory—						
Wolfram.....	5	2	2	3	1	1
Uganda—						
Wolfram.....			1			1
Union of South Africa—						
Tungsten ore.....	9	29	34	6	18	25
Burma—						
Concentrates.....	3,837	4,552	4,998	2,494	2,959	3,249
Federated Malay States—						
Wolfram.....	8	3	27	5	2	19
Scheelite.....	1,365	1,364	836	983	982	602
India—						
Concentrates.....			13			8
Unfederated Malay States—						
Wolfram.....	274	282	242	178	183	157
Australia—						
Wolfram.....	441	332	726	287	216	472
Scheelite.....	4	12	12	2	8	8
New Zealand—						
Concentrates.....	39	28	24	25	18	16
FOREIGN COUNTRIES						
Norway—						
Wolfram.....			3			2
Portugal—						
Concentrates.....	1,048	1,282	1,776	666	812	1,190
Tin-tungsten ores.....	73	109	90	20	36	33
Sweden—						
Tungsten ore.....		66	136		36	75
Egypt—						
Concentrates.....			176			114
Mexico.....	49	51	30	32	33	20
United States—						
Concentrates.....	2,138	2,332	3,125	1,283	1,399	1,875
Argentina—						
Concentrates.....	531	645	(a)	370	450	(a)
Bolivia (exports)—						
Concentrates.....	1,344	1,685	1,774	840	1,028	1,064
Brazil (exports)—						
Tungsten ore.....			7			4
Chile—						
Concentrates.....	6	4	4	4	2	3
Peru—						
Concentrates.....	53	94	(a)	34	24	(a)
China (exports)—						
Ore.....	7,267	6,939	16,257	4,360	4,763	9,754
French Indo-China—						
Concentrates.....	377	420	571	246	297	383
Japan—						
Scheelite.....	88	55	(a)	57	36	(a)
Korea—						
Ore.....	861	1,680	(a)	560	1,092	(a)
Netherlands East Indies—						
Concentrates.....	2	1		1	1	
Siam—						
Concentrates.....	75	75	(a)	49	49	(a)

Tungsten ores are also produced in U.S.S.R. and Spain.

(a) Information not available.

VANADIUM

Some of the magnetites of the Rainy River district in Ontario are known to contain relatively small quantities of vanadium and some research has been conducted as to its economic recovery. There is no production of either the metal or its ores in Canada at the present time.

The principal occurrences of vanadium are in Arizona, Colorado and Utah in the United States; Minasragra in Peru; Broken Hill in Northern Rhodesia; and Grootfontein district in South West Africa.

The metal is employed chiefly in the manufacture of alloy steels and irons. It is also used in the form of ammonia meta-vanadate as a catalyst in the manufacture of sulphuric acid.

Vanadium ore was quoted, October, 1938, by Metal and Mineral Markets, New York, per pound, V_2O_5 contained, $27\frac{1}{2}$ cents, f.o.b. shipping point. Ferro-vanadium, per pound of V contained, delivered, \$2.70 to \$2.80.

Imports of vanadium or vanadium compounds or alloys are not shown separately in Canadian trade reports.

Consumption of ferro-vanadium in Canada in the manufacture of steel totalled 26 long tons valued at \$52,483 in 1937 compared with 14 long tons worth \$31,630 in 1936.

Table 193.—World's Production of Vanadium Ores and Concentrates, 1936 and 1937

(Taken from the Minerals Yearbook of the United States Bureau of Mines)

(metric tons)

Country	1936	1937
Northern Rhodesia.....	204	235
Peru.....	161	583
South West Africa.....	547	582
United States.....	63	493

ZIRCONIUM

The metal is not produced in Canada; zircon is the most common zirconium mineral and the Department of Mines and Resources, Ottawa, states that it, or cyrtolite, commonly occurs in greater or less amount in Canadian Precambrian pegmatites, also in the pegmatitic apatite-phlogopite deposits of the Grenville areas in Ontario and Quebec.

Zirconium ores imported into the United States in 1937 rose to 17,868,139 pounds valued at \$129,576. Of these, Australia supplied 14,913,380 pounds valued at \$77,897, the remainder being divided almost equally between Brazil and British India.

"Mineral Industry" states—"Zirconium wire is used in radio tubes and sheet metal in spinneret cups for rayon manufacture. Zirconium-silicon and zirconium-ferrosilicon are finding a growing use in steel making and zirconium powder is used in flashlight mixtures and in ammunition primers; from a tonnage standpoint, however, the main uses of zirconium compounds are in enamels and for electrodes or welding-rod coatings, as a scavenger for oxides and nitrides in steel, and as a refractory".

According to Industrial and Engineering Chemistry, zirconium is used successfully in the form of zircon and sodium zirconium silicate in enamel and glaze frits, to produce opacity; as zirconium oxide it is used as a smelt in the frit and more recently as a mill addition opacifier.

Imports into Canada of zirconium oxide in 1937 were valued at \$32,668 while those of zirconium silicate totalled \$2,065.

Zircon ore was quoted by Metal and Mineral Markets, New York, October, 1938, per ton, 55 per cent ZrO_2 , f.o.b. Atlantic seaboard, carload lots, \$55; 5-ton lots, \$60. Crude granular zircon, \$70, f.o.b. Suspension Bridge, New York; milled, \$90.

Table 194.—Principal Statistics* of the Miscellaneous Metal Mining Industry in Canada, 1935-1937

	1935	1936	1937
Number of firms	12	11	(c) 15
Capital employed (a)	\$ 733,497	770,957	1,320,012
Number of employees—On salary	9	13	20
On wages	73	100	101
Total	82	113	121
Salaries and wages—Salaries	\$ 12,390	11,110	25,628
Wages	\$ 51,222	131,864	129,563
Total	\$ 63,612	142,974	155,191
Value of production (gross)	\$ 32,147	33,492	86,040
Cost of fuel and electricity	\$ 4,051	8,894	15,068
Process supplies used	\$ 5,249	21,451	17,466
Smelter charges	(b)	(b)	.....
Freight	(b)	(b)	251
Value of production (net)	\$ 22,847	3,147	52,655

(*) Does not include data relating to smelters and refineries or to mining in the Northwest Territories.

(a) Exclusive of ore reserves.

(b) Included in gross value.

(c) Nova Scotia, 2 firms; New Brunswick, 2 firms; Quebec, 4 firms; Ontario, 3 firms; British Columbia, 4 firms.

Table 195.—Capital Employed in the Miscellaneous Metals Mining Industry in Canada, 1937

	\$
Capital employed as represented by:—	
(a) Present cash value of the land (excluding minerals)	1,052,175
(b) Present value of buildings, fixtures, machinery, tools and other equipment	247,962
(c) Inventory value of materials on hand, ore in process, fuel and miscellaneous supplies on hand	17,579
(d) Inventory value of finished products on hand	700
(e) Operating capital (cash, bills and accounts receivable, prepaid expenses, etc.)	1,596
Total	1,320,012

Table 196.—Employees, Salaries and Wages in the Miscellaneous Metal Mining Industries in Canada, 1937

	Number of employees		Salaries and wages
	Male	Female	\$
Salaried employees—			
Total	17	3	25,628
Wage-earners—			
Surface	64	.....	129,563
Underground	33	.....
Mill	4	.....
Total	101	.....	129,563
Grand Total	118	3	155,191

Table 197.—Average Number of Wage-Earners Employed, by Months, 1935-1937

Month	1935	1936	1937		
			Surface	Underground	Mill
January	42	44	61	54	10
February	55	53	66	55	2
March	73	65	46	45	2
April	62	66	57	44	2
May	51	63	61	42	2
June	79	88	48	28	.....
July	80	144	71	25	.....
August	78	109	100	21	.....
September	83	131	102	22	.....
October	92	152	62	28	7
November	86	137	50	13	11
December	85	131	38	16	3

CHAPTER SIX

THE NON-FERROUS SMELTING AND REFINING INDUSTRY IN CANADA

The Non-Ferrous Smelting and Refining Industry, as defined by the Dominion Bureau of Statistics, comprises those firms engaged primarily in the smelting of non-ferrous ores or concentrates and the refining of metals recovered therefrom.

The gross value of products from all plants in 1937, totalling \$318,278,251, was the highest ever recorded for the industry. Refined products included gold, silver, copper, lead, zinc, aluminium, cobalt, cadmium, selenium, tellurium, radium salts, uranium compounds, and sulphur; other end products of individual plants or companies were copper-nickel matte, cobalt salts, nickel and cobalt oxides, arsenious oxide, sulphur in sulphuric acid, platinum metals residues, silver sulphide, silver-bismuth bullion, zinc dust, zinc oxide (fume), blister and anode copper, and copper matte.

The cost of ores, concentrates and other material treated during 1937 was estimated at \$191,303,251; fuels and purchased electricity consumed totalled \$14,607,421; chemicals and various other process supplies used amounted to \$10,559,714, and the net value of production, or the value added by processing, was estimated at \$101,807,865, an increase of 42.83 per cent over the corresponding value recorded for the preceding year.

The industry reported \$162,696,595 as the amount of capital employed in 1937. This figure includes value of land, plant, materials on hand and in process, finished products and operating funds. Employees totalled 11,570 and salaries and wages paid aggregated \$17,990,947, representing increases over 1936 of, respectively, 15.53 and 25.41 per cent.

As a world producer of metals in 1937, Canada ranked third in production of copper in all forms and fourth in smelter output of the metal; in both mine and smelter production of lead Canada was surpassed in 1937, in the order of output, by only the United States, Mexico, and Australia. In output of zinc in all forms during 1937 the Dominion was exceeded by only the United States and in output of refined metal by the United States, Belgium and Germany. As a gold and silver producer Canada stood third in 1937 and fourth in output of aluminium; in production of nickel and the platinum metals, Canada retains a premier world position.

The Internal Trade Branch of the Dominion Bureau of Statistics reported that the international price outlook changed rapidly during 1937, with early fears of excessive inflation in the spring months giving way to uneasiness regarding sharp declines in basic commodity markets during the fourth quarter. The most vigorous phase of the price recovery extending over the past five years occurred in the latter half of 1936 and the first quarter of 1937. International commodity markets reacted abruptly in April, and then displayed somewhat hesitant behaviour in the summer months, before recording further severe losses in the final quarter of 1937.

In Canada, iron and steel products were firm in both 1936 and 1937 but non-ferrous metals dropped sharply in the latter part of 1937, following speculative interest which collapsed in April; the average prices for copper, lead and zinc for the calendar year 1937 were, however, considerably higher than during the immediately preceding years.

Fluctuations in base metal stock prices were the most violent in many years. The net decline for 1937 indicated by comparison of 1936 and 1937 December averages was 33 per cent, as compared with 12 per cent for gold issues. Although the year's peak in base metals came later in February, major turning points for the group coincided closely with those for the gold section. They were marked by the following daily price indexes: 321.8 on January 4, 372.6 on February 22, 234.9 on June 23, 299.8 on August 7, 168.7 on October 19, and 214.7 on December 31. The closing rise in stock prices anticipated later improvement in commodity markets.

Review of the Industry by Provinces

Quebec.—The reduction of aluminium ores and the production of primary aluminium in Canada is confined to the province of Quebec. In this province the Aluminum Company of Canada, Limited, operates an ore treatment plant at Arvida and reduction plants at both Arvida

and Shawinigan Falls. These three plants were in continuous operation throughout 1937. At the Arvida ore plant concentrates were made from British Guiana bauxite and aluminium ingot was produced in the two reduction works. The company also operates fabricating plants at Shawinigan Falls, Quebec, and Toronto, Ontario. Bauxite from British Guiana, used for the production of aluminium, is washed and dried before being shipped; at Arvida, Quebec, it is treated by a standard chemical process to remove impurities, and pure aluminium oxide is recovered. Cryolite, necessary in the production of the metal, is imported from Greenland. A very large amount of electrical energy is utilized in the production of new aluminium metal from bauxite concentrates.

During 1937 the smelter of Noranda Mines Limited, located at Noranda, Quebec, treated 1,155,755 tons of ore, concentrate and refinery slag and produced 89,915,813 pounds of anodes. After deducting the copper, gold and silver which was recovered from the refinery slag, the estimated production of new copper, gold and silver was 87,060,237 pounds of fine copper, 280,806 ounces of gold, and 705,494 ounces of silver. Included in the above figures is the production from 51,338 tons of customs ore and concentrate. If the estimated production from this customs ore and concentrate is deducted, the estimated recovery from the Horne mine is 80,172,108 pounds of fine copper, 274,162 ounces of gold, and 599,911 ounces of silver. The concentrator milled 1,106,609 tons of ore from the Horne mine, the average analysis of which was 2.02 per cent copper, 0.131 ounce gold per ton, and 0.35 ounce silver per ton, from which 182,837 tons of copper-gold concentrate were produced and sent to the smelter. The tailing from the copper-gold flotation circuit was retreated by flotation, and a gold-bearing pyrite concentrate produced; 150,933 tons of this pyrite were treated in the cyanide plant and 9,856 ounces of gold were recovered from it. During the year an additional roasting furnace was installed in the smelter and the second reverberatory smelting furnace was lengthened nine feet.

With increased copper production from the Horne mine an increase in receipts of copper for custom refining, the refinery of Canadian Copper Refiners, Limited, located at Montreal East, operated considerably beyond its original intended capacity in 1937. An addition to the tank room was being constructed which will raise the capacity by 6,000 tons per year, bringing the total capacity to approximately 81,000 tons per annum.

Ontario.—In 1937 the concentrator of the International Nickel Company of Canada, Limited, operated at capacity and treated 4,583,100 tons of ore at a rate slightly in excess of 12,500 tons per day. The Copper Cliff smelter produced 188,169 tons of bessemer matte and 158,100 tons of converter copper; the Coniston smelter was operated at full capacity and ore to the amount of 891,956 tons was treated and 54,329 tons of bessemer matte produced.

Capacity having been increased the nickel refinery of the International Nickel Company of Canada, Limited, located at Port Colborne, Ontario, produced 147,264,099 pounds of refined nickel; the research staff of this plant was increased and more adequate laboratory facilities installed. In addition to being the greatest producer of nickel, the company is now the world's largest producer of platinum metals.

The Copper Cliff refinery of the Ontario Refining Company, Limited, processed 159,286 tons of converter copper that was produced at the Copper Cliff smelter of the International Nickel Company and produced 145,600 tons of refined copper. The converter copper received during the year was largely in the form of metal which was transported in molten form from the Copper Cliff smelter and charged directly to the anode furnaces; in future, all converter copper will be transferred to the refinery as molten metal. The research department was engaged actively in development work and in studies of processes. The results of its work in co-operation with the operating staff were reflected in increased efficiencies, particularly in important advances in electric furnace refining.

In 1937 the ore dressing plant of Falconbridge Nickel Mines, Limited, operated on a six day week basis while the reduction plants lost only 3 per cent of full operating time, accounted for by periodic repair campaigns. Ore treated totalled 438,629 tons of which 195,658 tons were milling ore and 242,971 tons smelting ore. The company produced 13,384.2 short tons of matte, containing 7,384.4 short tons of nickel and 3,522.8 short tons of copper. The indicated grade of ore treated after waste rejection was nickel 1.87 per cent, and copper 0.925 per cent. It was found necessary to rearrange and extend the grinding facilities and add further flotation, thickening and filtering equipment, involving also an addition to the building. To improve conditions in the sintering plant, a third machine was installed.

At Port Hope, Ontario, a new chemical plant for the recovery of radium in the form of radium-barium sulphate concentrate and silver in the form of silver sulphide was erected by Eldorado Gold Mines Ltd. Chemical operations by the company were limited to nine months in 1937, the old plant being operated to full capacity up to October 1. At that date it was necessary to close all chemical treatment for transfer of the equipment from the old plant to the new. The ore shipments received at the plant from the mine in 1937 amounted to 339 tons. The roasting and milling plant treated 294 tons of ore and produced 302 tons of roasted ore ready for chemical treatment. From the 302 tons of ore obtained after roasting and milling, 290 tons were used during the year, and entered into the chemical treatment for the recovery of silver, radium and uranium. Treatment for the silver was fully completed on the 290 tons entered; for uranium, 287 tons, and for radium, 305 tons, which included some of the ore in course of finishing at the beginning of the year. Recovery for both radium and uranium was about 90 per cent and for silver about 96 per cent. At current market values, the total production of finished products of radium, uranium and silver amounted to \$850,000. All silver produced during the year was in the form of silver sulphide which was disposed of entirely in the United States for silver refineries. During the year a certain amount of lead contained in the ore was recovered chemically in the form of lead sulphate, to meet the demand for radio-active lead as a source of radium D.

At Deloro, in Hastings county, the smelter and refinery of the Deloro Smelting and Refining Company, Limited, was in continuous operation throughout the year. This company treats silver-cobalt ores from Northern Ontario and produces silver bullion, white arsenic, cobalt metal, cobalt salts and oxides, nickel oxide, and a silver-lead-bismuth bullion.

Manitoba and Saskatchewan.—The copper smelter of the Hudson Bay Mining and Smelting Company, Limited, is located on or adjacent to the interprovincial boundary between Manitoba and Saskatchewan. There was treated in the concentrator of this company during 1937 an average of 4,503 tons of ore per day, or a total of 1,643,452 tons. Both the daily tonnage treated and the yearly tonnage were slightly higher than they were for the preceding year. The assay per ton of ore milled averaged gold 0.107 ounce, silver 1.52 ounces, copper 2.17 per cent and zinc 4.7 per cent. From this was produced a total of 315,124 tons of copper concentrates assaying gold 0.387 ounce, silver 5.23 ounces, copper 9.92 per cent, and of 106,025 tons of zinc concentrates assaying gold 0.077 ounce, silver 1.74 ounces, copper 0.75 per cent and zinc 45.2 per cent.

The copper smelter was operated continuously throughout the year, treating considerably more pay charge than in the preceding year and producing a record tonnage of blister copper. Not only was there a greater tonnage of pay charge delivered to the smelter from Flin Flon mine materials but customs concentrates were being treated continuously throughout the latter part of the year. In order to smelt this greatly increased tonnage a number of alterations and additions to equipment were made.

There was smelted during the year a total of 320,918 tons of Flin Flon ore and concentrates averaging gold 0.432 ounce, silver 5.53 ounces, copper 9.84 per cent, and 21,462 tons of customs ore and concentrates assaying gold 0.150 ounce, silver 3.84 ounces and copper 23.09 per cent. There were shipped 34,240 tons of blister copper with an average assay of gold 3.974 ounces, silver 50.44 ounces and copper 98.80 per cent.

The zinc plant operated continuously during the year and produced the largest amount of slab zinc for any year to date. There was treated in the zinc plant a total of 94,936 tons of zinc concentrates which averaged gold 0.079 ounce, silver 1.76 ounces, copper 0.75 per cent, and zinc 45.2 per cent; from these concentrates was produced for sale a total of 68,972,224 pounds of slab zinc. There was also produced the usual zinc plant residue which was sent to stockpiles. The tank house was extended by about one-third its former size and an addition was built on the zinc leaching plant. The cadmium plant was operated continuously throughout the year.

British Columbia.—The Consolidated Mining and Smelting Company of Canada, Limited, treated 2,267,170 short tons of ore at its Kimberley and Trail plants in 1937. Once again the lead smelting plant made an all-time high record; costs in this plant were higher during the first eight months of the year but lower during the last four months of 1937. The lead, silver and

gold refineries also made a new all-time high record, the production of refined lead being 200,284 tons in 1937, 182,541 tons in 1936, and 164,329 tons in 1935. Refining costs were held at the same figure through the year, the last three months each being a new low record; silver production was 9,846,545 ounces.

A plant to recover metallic antimony from the by-products of the silver refinery was under construction in 1937. This plant should have a capacity of between four and five tons of metallic antimony per day and was expected to be in operation in the near future.

Production in the zinc plant was also a new record at 124,094 tons. In addition to this, 41,860 tons of zinc concentrates were exported to Europe. The waste heat boilers which have been installed on the concentrate burning furnaces have been a great success and are providing a large amount of the steam required for the chemical operations. All of the zinc plant roaster gases have been treated for the recovery of sulphur dioxide for the greater part of the year.

An increase of 18 tons capacity per day was being installed in the ammonia plant and further increases in the sulphur, sulphuric acid and absorption plants were being made or under design; these will enable the company to treat all of the smelter gases for the recovery of sulphur dioxide.

Table 198.—Capital Employed in the Non-Ferrous Smelting and Refining Industry in Canada, 1937

Capital employed as represented by—	\$
(a) Present cash value of the land (excluding minerals).....	6,171,344
(b) Present value of buildings, fixtures, machinery, tools and other equipment.....	106,890,414
(c) Inventory value of materials on hand, ore in process, fuel and miscellaneous supplies on hand.....	25,479,060
(d) Inventory value of finished products.....	3,539,246
(e) Operating capital (cash, bills and accounts receivable, prepaid expenses, etc.).....	20,616,531
Total.....	162,696,595

Table 199.—Principal Statistics of the Non-Ferrous Metallurgical Industry in Canada, 1935-1937

	1935	1936	1937
Number of companies.....	12	11	(c) 10
Number of plants.....	14	14	13
Capital employed.....	\$ 145,686,299	143,858,717	162,696,595
Number of salaried employees.....	935	863	1,003
Salaries.....	\$ 2,055,694	2,176,110	2,575,849
Number of wage-earners.....	8,009	9,152	10,567
Wages.....	\$ 10,631,662	12,169,940	15,415,098
Value of plant products (gross) (†).....	\$ 186,245,658	229,737,420	318,278,251
Estimated cost of ores, concentrates, etc., treated (a).....	\$ 108,081,395	137,857,432	191,303,251
Cost of fuel and purchased electricity (b).....	\$ 11,242,698	12,613,763	14,607,421
Process supplies other than items (a) and (b).....	\$ 7,479,978	7,989,580	10,559,714
Value added by smelting (net).....	\$ 59,441,587	71,276,645	101,807,865

† The gross value of production should not be interpreted as the ultimate sales value of finished metal only, as it represents the combined values of all industrial (smelting, refining, etc.) end products (blister copper, matte, etc.) and in this sense is a duplication of values. Products include gold, silver, platinum metals; blister and anode copper; refined lead, zinc, copper and nickel; nickel-copper matte, nickel oxide, nickel salts, cobalt, cobalt oxide, aluminium, base bullion, cadmium, bismuth, arsenic, tellurium, selenium, radium and uranium salts and oxides and sulphur.

(c) Quebec, 3 firms; Ontario, 5 firms; Manitoba and Saskatchewan, 1 firm; British Columbia, 1 firm.

Table 200.—Number of Wage-Earners, by Months, 1932-1937

Month	1932	1933	1934	1935	1936	1937
January.....	5,496	5,003	6,870	7,280	8,660	9,814
February.....	5,400	4,831	6,832	7,407	8,544	9,842
March.....	5,355	4,926	7,034	7,452	8,665	9,966
April.....	4,750	4,890	7,264	7,636	8,694	10,153
May.....	4,297	4,910	7,530	7,945	8,858	10,458
June.....	4,475	5,534	7,717	7,982	8,912	10,814
July.....	4,205	6,080	7,734	8,201	9,406	11,047
August.....	4,160	6,322	7,767	8,495	9,606	11,172
September.....	4,198	6,368	7,595	8,231	9,626	11,031
October.....	4,326	6,478	7,816	8,365	9,623	10,895
November.....	4,316	6,396	7,620	8,587	9,542	10,868
December.....	4,274	6,410	7,606	8,529	9,669	10,749
Average.....	4,604	5,681	7,449	8,009	9,152	10,567

NOTE.—For details of fuel and electricity used and machinery installed by the non-ferrous smelting industry see Chapter I.

Table 201.—Capacities of Canadian Copper Smelting and Refining Works, 1937

Company	Blast furnaces		Reverberatories		Converters	
	Number	Annual capacity—tons of ore and concentrates	Number	Annual capacity—tons of ore and concentrates	Number	Annual capacity—tons of ore and concentrates
Consolidated Mining & Smelting Co. of Canada, Ltd. (a)	1		1	75,000	2	16,000
Falconbridge Nickel Mines Ltd.	1	275,000			3	25,000
Hudson Bay Mining & Smelting Co. Ltd.			1	352,000	2	
Noranda Mines Ltd.			2	1,060,000	4	230,000
International Nickel Co. of Canada, Ltd.	4	800,000	7	2,800,000	24	

(a) Idle.

ELECTROLYTIC COPPER REFINERIES—

Annual capacity—short tons

Canadian Copper Refiners Ltd.	75,000
Ontario Refining Company, Ltd.	120,000

The copper refining capacity of the world, covering both electrolytic and furnace methods, at the end of 1937, was summarized by The American Bureau of Metal Statistics as follows, in short tons:

United States	1,642,000	Scandinavia	25,000
Canada	195,000	Other Europe	170,000
South America	400,000	Asia	120,000
Germany	235,000	Africa	97,000
Great Britain	230,000	Australia	45,000
		Total	3,159,000

Table 202.—Lead Smelting Capacity of Canada, 1937

Company	Situation of plant	Number of blast furnaces	Annual capacity (tons of charge)
Consolidated Mining & Smelting Co. of Canada, Ltd.	Trail, B.C.	5	700,000

LEAD REFINING CAPACITY IN CANADA, 1937

Company	Annual capacity for refined lead
Consolidated Mining & Smelting Co. of Canada, Ltd., Trail, B.C.	200,000 short tons

LEAD REFINING CAPACITY OF THE WORLD, 1937

(American Bureau of Metal Statistics)

The lead refining capacity of the world, as at the end of 1937, aggregated about 1,084,000 short tons in the United States and about 2,143,000 elsewhere, a grand total of about 3,227,000 tons. There was an increase of about 124,000 tons in the reported capacity during 1937, about 54,000 tons in the United States and 70,000 in foreign countries.

Probably not more than 950,000 tons of the listed capacity in the United States and 1,550,000 tons elsewhere, a total of 2,500,000 tons, is to be rated as useful and effective, the remainder being obsolete, incapable of economical ore supply, or otherwise useless. These accountings are exclusive of capacity in Russia, and also of a few thousand tons in Greece.

Table 203.—Capacity of Electrolytic Zinc Plants in Canada, 1937

	Maximum H.P. used	Estimated annual capacity for cathode zinc (short tons)
		(a)
Consolidated Mining & Smelting Co. of Canada, Ltd.....	72,000	145,000
Hudson Bay Mining & Smelting Co., Ltd.....	21,750	43,000

(a) Capacity for ingot zinc may be reckoned at 95% of capacity for cathode deposition.

The American Bureau of Metal Statistics estimates the capacity of American zinc metallurgical works at the end of 1937 as being nominally for the production of about 600,000 short tons of spelter per annum by distilling, including the capacity in continuously operating vertical retorts, and about 210,000 tons by electrolysis, a total of about 810,000 tons, but the first-class effective capacity is probably something less than that. The effective capacity outside the United States at the end of 1937 is estimated at 1,150,000 metric tons whereof about 250,000 tons were in Australia, Canada and Mexico, and about 900,000 tons elsewhere. The estimate of 1,150,000 tons for foreign plants is exclusive of plants in Russia.

CHAPTER SEVEN

THE COAL MINING, COKE, NATURAL GAS, PEAT AND PETROLEUM INDUSTRIES
(Fuels) IN CANADA

The Coal Mining Industry in Canada

1. General Review
2. Commodity Statistics on Coal—including Tables on Output, Disposition, Shipments, Imports into Canada and Exports, Consumption and World Output.

The Coke and Gas Industry in Canada

The Peat Industry in Canada

The Petroleum Industry in Canada

1. Production of Crude Petroleum
2. Production of Petroleum Products

NOTE.—In order to correlate data, regarding fuels in Canada, this chapter has been prepared to include statistics of the coal, natural gas, peat and petroleum industries. This survey presents information in detail regarding these industries as a whole, dealing principally with the mineral industry, although supplementary data are shown for closely allied manufacturing operations.

THE COAL MINING INDUSTRY

Coal production in Canada during 1937 was the highest on record since 1929. The output during the year totalled 15,835,954 tons worth \$48,752,048 compared with 15,229,182 tons at \$45,791,934 in 1936 and 17,496,557 tons at \$63,065,170 in 1929. The 1937 production consisted of 11,634,379 tons of bituminous coal, 506,260 tons of sub-bituminous coal, and 3,695,315 tons of lignite coal.

Nova Scotia's output rose 9.1 per cent in 1937 to 7,256,954 tons. New Brunswick mines produced 364,714 tons compared with 368,618 tons in 1936. Manitoba operators reported an output of 3,172 tons; a year ago, 4,029 tons were produced. An increase of 2.8 per cent was recorded in Saskatchewan's production in 1937 when 1,049,348 tons were mined as against 1,020,792 tons in the preceding year. During 1937, Alberta produced 5,562,839 tons made up of 2,413,784 tons of bituminous coal, 506,260 tons of sub-bituminous coal, and 2,642,795 tons of lignite coal. In 1936, Alberta's output included 2,288,734 tons of bituminous coal, 566,235 tons of sub-bituminous coal, and 2,841,991 tons of lignite coal. A 7.4 per cent advance was shown in British Columbia's output in 1937 compared with the preceding year; the totals were 1,598,843 tons and 1,489,171 tons, respectively. The Yukon production declined to 84 tons from the 1936 total of 510 tons.

Canada exported 355,268 tons of coal in 1937 or 13.7 per cent below the 1936 total of 411,574 tons. Exports through Prince Edward Island, Nova Scotia, New Brunswick, Quebec, and Central Ontario ports totalled 204,411 tons and through Manitoba, Saskatchewan, Alberta and British Columbia ports, 150,857 tons. From April 1, 1937, Canadian coal sold for bunkering purposes was not included in the export totals.

Imports of coal into Canada in 1937 advanced to 16,023,147 tons from the 1936 total of 13,735,166 tons. Receipts of anthracite coal during the year under review aggregated 3,572,268 tons and included 1,994,619 tons from the United States, 1,134,855 tons from Great Britain, 273,696 tons from Germany, 160,889 tons from Russia, 8,131 tons from Belgium, and 78 tons from Morocco. In 1937, Great Britain supplied 31.8 per cent of the Canadian anthracite requirements; 37.8 per cent in the preceding year; 42.1 per cent in 1935, and 46.5 per cent in 1934. The United States accounted for 55.8 per cent of the anthracite imports during the year under review, 47.8 per cent a year ago, 48.4 per cent in 1935, and 51.0 per cent in 1934. An increase of 22 per cent was recorded in bituminous coal importations when 12,449,385 tons were brought into Canada. These imports consisted of 99.1 per cent from the United States, 0.5 per cent from Great Britain, 0.4 per cent from Germany, and the remainder from Esthonia and Norway. The United States supplied the Canadian market with 1,494 tons of lignite coal in 1937.

The Canadian coal mining industry furnished employment, on the average, to 25,890 wage-earners in 1937 compared with 25,597 in 1936. Nova Scotia and New Brunswick mines employed 14,318 men and the western mines, 11,572 men. Surface employees averaged 259 days work during the year and underground workers, 229 days. There were, in addition to these men, 1,312 salaried employees on the mine pay-rolls. All employees working in or about the Canadian coal mines in 1937 were paid \$31,641,679 compared with \$28,873,135 in 1936.

Coal made available for consumption in Canada during 1937 amounted to 31,503,833 tons or 10.3 per cent above the preceding year's total of 28,552,774 tons.

Canada consumes, in addition to coal, large quantities of coke, natural and artificial gas, fuel oil, wood and electricity for industrial and domestic purposes. In 1937, the Canadian coke supply was computed at 2,951,059 tons; this represented a 1.6 per cent decrease from the 1936 total. Sales of coke by Canadian producers totalled 1,491,793 tons of which 36,959 tons were exported. These sales represented 56.7 per cent of the year's output; the remainder of the output was used by producing companies in their own plants and associated metallurgical works. Imports of coke declined to 417,733 tons from the 1936 total of 612,858 tons. Coke and gas manufacturers in Canada carbonized 1,154,315 tons of Canadian bituminous coal and 2,425,635 tons of imported bituminous coal during 1937.

Table 204.—Capital Employed in the Coal Mines of Canada, by Provinces, 1936 and 1937

Province	1936				1937			
	Capital employed as represented by				Capital employed as represented by			
	Cost of lands, buildings, machinery and tools	Cost of supplies and stocks on hand	Cash trading and operating accounts and bills receivable	Total	Cost of lands, buildings, machinery and tools	Cost of supplies and stocks on hand	Cash, trading and operating accounts and bills receivable	Total
	\$	\$	\$	\$	\$	\$	\$	\$
Nova Scotia.....	36,980,155	3,213,068	5,446,250	45,639,473	41,604,785	3,365,312	5,163,041	50,133,138
New Brunswick...	1,026,542	68,517	275,622	1,370,681	935,121	32,419	341,229	1,308,769
Manitoba.....	4,400	408	890	5,698	4,000	100	500	4,600
Saskatchewan....	2,605,561	84,628	406,014	3,096,203	2,701,973	76,394	340,960	3,119,327
Alberta.....	31,435,333	938,240	8,231,002	40,604,575	30,935,737	953,018	6,567,237	38,455,992
British Columbia..	15,965,370	412,959	2,403,334	18,781,663	22,566,174	553,593	1,929,005	25,048,772
Yukon.....	203,000	1,750	.....	204,750	203,000	250	.....	203,250
Canada.....	88,220,361	4,719,570	16,763,112	109,703,043	98,950,790	4,981,086	14,341,972	118,273,848

Table 205.—Employees, Salaries and Wages in the Coal Mines of Canada, by Provinces, 1937

Province	Average number of employees					Salaries and wages		
	Salaried employees		Wage-earners		Total	Salaries	Wages	Total
	Male	Female	Surface	Under-ground				
						\$	\$	\$
Nova Scotia.....	435	55	2,141	11,127	13,758	898,024	15,704,084	16,602,108
New Brunswick...	37	6	273	777	1,093	80,095	756,883	836,978
Manitoba.....	.....	.....	2	8	10	.....	3,741	3,741
Saskatchewan....	49	9	255	619	932	100,064	602,865	702,929
Alberta.....	527	33	2,009	5,804	8,373	1,182,207	8,370,001	9,552,208
British Columbia..	148	13	880	1,993	3,034	374,928	3,568,627	3,943,555
Yukon.....	.....	.....	.....	2	2	.....	160	160
Canada.....	1,196	116	5,560	20,330	27,202	2,635,318	29,006,361	31,641,679

Table 206.—Wage-earners Employed and Days' Work Done, by Months, in the Coal Mines of Canada, 1937, with Comparative Totals for 1936

Month	Number of wage-earners			Days' work done		
	Surface	Under-ground	Total	Surface	Under-ground	Total
January.....	5,885	22,228	28,113	126,983	409,023	536,006
February.....	5,779	21,818	27,597	117,569	380,196	497,765
March.....	5,486	20,349	25,835	108,868	331,563	440,431
April.....	5,195	18,742	23,937	100,223	303,760	403,992
May.....	5,280	18,897	24,177	110,263	363,647	473,910
June.....	5,035	17,630	22,665	109,939	335,619	445,558
July.....	5,075	17,779	22,854	109,569	369,374	478,943
August.....	5,365	19,301	24,666	118,039	393,277	511,316
September.....	5,762	21,093	26,855	127,699	425,706	553,405
October.....	6,115	22,129	28,244	144,434	473,872	618,306
November.....	5,812	21,817	27,629	135,640	457,508	593,148
December.....	5,935	22,180	28,115	131,876	430,664	562,540
Total for 1937.....				1,441,102	4,654,218	6,095,320
Total for 1936.....				1,374,980	4,381,935	5,756,915

Table 207.—Output of Coal in Canada, by Grades, 1928-1937

Calendar year	Bituminous		Sub-Bituminous		Lignite		Total		Average value per ton
	Short tons	Value	Short tons	Value	Short tons	Value	Short tons	Value	
		\$		\$		\$		\$	\$
1928.....	12,971,744	50,584,108	740,496	2,076,212	3,852,053	11,097,513	17,564,293	63,757,833	3-63
1929.....	12,859,822	49,985,261	668,702	1,908,954	3,968,033	11,160,955	17,496,557	63,065,170	3-60
1930.....	10,824,839	41,789,061	603,358	1,705,236	3,453,127	9,355,451	14,881,324	52,849,748	3-55
1931.....	8,861,360	33,165,730	471,343	1,211,197	2,910,508	6,830,755	12,243,211	41,207,682	3-37
1932.....	7,714,279	28,073,744	560,902	1,329,316	3,463,732	7,714,635	11,738,913	37,117,695	3-16
1933.....	7,979,283	27,757,150	554,118	1,274,017	3,369,943	6,892,795	11,003,344	35,923,962	3-02
1934.....	10,058,782	34,356,274	537,508	1,256,936	3,213,903	6,432,732	13,810,193	42,045,942	3-04
1935.....	9,748,841	33,150,751	566,425	1,410,926	3,572,740	7,401,403	13,888,006	41,963,110	3-02
1936.....	10,796,135	36,256,347	566,235	1,432,741	3,866,812	8,102,846	15,229,182	45,791,934	3-00
1937.....	11,634,379	39,661,259	506,260	1,314,196	3,695,315	7,776,593	15,835,954	48,752,048	3-08

Table 208.—Output and Value of Coal in Canada, by Kinds and by Provinces, 1936 and 1937

(Short tons)

Province	1936			1937		
	Number of mines	Quantity	Value	Number of mines	Quantity	Value
			\$			\$
NOVA SCOTIA (Bituminous).....	39	6,649,102	22,973,281	38	7,256,954	25,640,819
NEW BRUNSWICK (Bituminous).....	27	368,618	1,190,032	24	364,714	1,180,611
MANITOBA (Lignite).....	2	4,029	9,525	2	3,172	7,709
SASKATCHEWAN (Lignite).....	*161	1,020,792	1,463,680	*143	1,049,348	1,494,337
ALBERTA—						
Bituminous.....	17	2,288,734	6,597,323	17	2,413,784	6,975,168
Sub-bituminous.....	18	566,235	1,432,741	17	506,260	1,314,196
Lignite.....	266	2,841,991	6,629,641	236	2,642,795	6,274,547
Total.....	†301	5,696,960	14,659,705	†270	5,562,839	14,563,911
BRITISH COLUMBIA (Bituminous).....	22	1,489,171	5,493,425	25	1,598,843	5,863,849
YUKON (Bituminous).....	1	510	2,286	1	84	812
CANADA—						
Bituminous.....	106	10,796,135	36,256,347	105	11,634,379	39,661,259
Sub-bituminous.....	18	566,235	1,432,741	17	506,260	1,314,196
Lignite.....	429	3,866,812	8,102,846	381	3,695,315	7,776,593
Total.....	553	15,229,182	45,791,934	503	15,835,954	48,752,048

* Exclusive of 47 small mines in operation during part of 1936 and 46 small mines operating during part of 1937.

† Exclusive of 31 small mines operated under special permits in 1936 and 53 small mines in 1937.

Table 209.—Disposition of Coal from Canadian Mines, 1936 and 1937

	1936			1937							
	Total coal	Total value	Average value per ton	Run-of-mine	Cobble	Lump	Nut and other grades	Slack	Total coal	Total value	Average value per ton
	Tons	\$	\$	Tons	Tons	Tons	Tons	Tons	Tons	\$	\$
Supplied to employees for domestic consumption.....	183,298	518,615	2.83	130,947	1,253	49,562	6,448	1,043	189,253	542,843	2.87
Used for power purposes—											
(a) Shops.....	92,519	369,428	3.99	546	.....	2,633	42,951	43,215	89,345	340,800	3.81
(b) Colliery boilers.....	564,269	1,461,518	2.59	126,669	355	3,073	85,978	355,394	571,469	1,478,980	2.59
(c) Companies' railroads.....	59,342	215,060	3.62	23,517	8,887	5,427	11,697	4,033	53,561	184,781	3.44
(d) Harbour tugs and dredges.....	1,306	4,271	3.27	1,249	.....	.....	.....	.....	1,249	4,425	3.54
Shipped. (See Table 211)—											
(a) Ships' bunkers.....	420,582	42,422,160	3.06	309,784	.....	129,963	57,510	2,092	499,349	45,435,881	3.15
(b) Railroads.....	3,337,459			2,794,725	.....	563,132	30,564	72,741	3,461,162		
(c) Other.....	10,092,267			1,058,596	207,598	3,434,284	1,534,924	4,226,586	10,461,988		
Used in making coke at colliery.....	149,713	352,764	2.36	.....	.....	.....	.....	175,287	175,287	416,640	2.38
Used in making briquettes.....	19,471	63,281	3.25	1,840	.....	.....	.....	23,494	25,334	76,767	3.03
Put on bank.....	1,357,052	4,402,264	3.24	198,503	2,027	512,251	27,906	880,189	1,620,876	5,360,713	3.31
Put on waste heap.....	216,429	.....	.....	.....	.....	.....	.....	.....	249,304	.....	.....
Total disposition.....	16,493,707	49,809,361	3.01	4,646,376	220,120	4,700,325	1,797,978	5,784,074	17,398,177	53,841,830	3.00
Lifted from bank.....	1,255,636	4,017,427	3.20	73,824	1,772	565,809	19,45	4,894,727	1,555,586	5,089,782	3.27
Lifted from waste heap.....	8,889	.....	.....	.....	.....	.....	.....	.....	6,637	.....	.....
Total output.....	15,229,182	45,791,934	3.01	4,572,552	218,348	4,134,516	1,778,524	4,889,347	15,835,954	48,752,048	3.08

Table 210.—Disposition of Coal from Canadian Mines, by Provinces, 1937

(Short tons)

	Nova Scotia	New Brunswick	Manitoba	Saskatchewan	Alberta	British Columbia	Yukon	Canada
Supplied to employees for domestic consumption.....	119,299	3,383	123	2,833	43,448	20,165	2	189,253
Coal shipped. (See Table 211) .	6,603,236	355,881	2,753	998,288	5,215,772	1,246,544	25	14,422,499
Used under colliery boilers, etc...	302,880	3,960	96	20,481	146,020	98,030	2	571,469
Used by companies' railroads....	33,540	800	.....	8,887	6,177	4,157	.....	53,561
Used for manufacture of coke at colliery.....	.....	.....	.....	.....	99,537	75,750	.....	175,287
Used in making briquettes.....	.....	.....	.....	.....	25,334	.....	.....	25,334
Used in shops, etc.....	89,345	.....	.....	.....	.....	.....	.....	89,345
Used by harbour tugs and dredges	1,249	.....	.....	.....	.....	.....	.....	1,249
Put on bank.....	1,460,293	14,308	200	10,540	46,085	89,395	55	1,620,876
Put on waste heap.....	71,889	615	.....	18,721	38,220	119,859	.....	249,304
Total disposition...	8,681,731	378,947	3,172	1,059,750	5,620,593	1,653,900	84	17,398,177
Lifted from bank.....	1,424,638	14,233	.....	10,402	51,328	54,985	.....	1,555,586
Lifted from waste heap.....	139	.....	.....	.....	6,426	72	.....	6,637
Total output.....	7,256,954	364,714	3,172	1,049,348	5,562,839	1,598,843	84	15,835,954

Table 211.—Shipments of Coal from Canadian Mines, by Grades and Destinations, 1936 and 1937

(Short tons)

Destination	1936					1937					
	Run-of-mine	Lump	Nut and other grades	Slack	Total	Run-of-mine	Cobble	Lump	Nut and other grades	Slack	Total
Prince Edward Island.....	5,948	49,073	4,343	11,333	70,697	6,710	.....	44,980	4,296	12,023	68,009
Nova Scotia.....	151,325	332,637	20,705	841,965	1,346,632	187,173	.....	400,287	29,199	929,819	1,546,478
New Brunswick.....	171,060	99,840	12,582	299,313	582,795	209,188	.....	96,231	16,536	346,293	668,248
Quebec.....	39,804	1,104,770	154,669	1,590,045	2,889,288	57,578	.....	1,066,590	134,776	1,741,202	3,000,146
Ontario.....	1,284	77,519	21,307	30,205	130,315	9,791	492	56,494	46,356	90,855	203,988
Manitoba.....	54,640	334,830	278,937	318,231	986,638	49,236	91,515	238,728	323,460	280,179	983,118
Saskatchewan.....	208,006	894,907	423,666	247,854	1,774,433	218,078	115,591	663,650	383,782	219,656	1,600,757
Alberta.....	227,574	512,553	302,730	283,165	1,326,022	259,433	.....	468,290	291,406	279,975	1,299,104
British Columbia.....	29,856	238,926	223,576	205,887	698,245	43,144	.....	263,270	257,276	215,946	779,636
Yukon.....	.....	.....	75	.....	75	.....	.....	.....	25	.....	25
Northwest Territories.....	.....	.....	.....	.....	.....	.....	.....	82	.....	.....	82
Total domestic shipments.....	889,497	3,645,055	1,442,590	3,827,998	9,805,140	1,040,331	207,598	3,298,602	1,487,112	4,115,948	10,149,591
Railroads—	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
In Canada.....	2,663,368	565,164	27,832	64,996	3,321,360	2,781,607	.....	553,712	30,290	72,215	3,437,824
In United States.....	11,638	326	463	.....	12,427	13,118	.....	140	274	526	14,058
In Newfoundland.....	.....	6,386	.....	.....	6,386	.....	.....	9,280	.....	.....	9,280
Ships' bunkers.....	278,194	96,174	44,073	2,141	420,582	309,784	.....	129,963	57,510	2,092	499,349
Total railroads and ships' bunkers.....	2,953,200	668,050	72,368	67,137	3,760,755	3,104,509	.....	693,095	88,074	74,833	3,960,511
United States.....	2,682	23,889	27,428	110,367	164,366	1,309	.....	23,021	47,655	110,626	182,611
Alaska.....	.....	12,588	125	.....	12,713	.....	.....	13,123	157	.....	13,280
Newfoundland.....	11,839	91,632	.....	248	103,719	15,811	.....	96,098	.....	12	111,921
Other countries.....	151	3,464	.....	.....	3,615	1,145	.....	3,440	.....	.....	4,585
Lost at sea.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Total external shipments.....	14,672	131,573	27,553	110,615	284,413	18,265	.....	135,682	47,812	110,638	312,397
Total.....	3,857,369	4,444,678	1,542,511	4,005,750	13,850,308	4,163,105	207,598	4,127,379	1,622,998	4,301,419	14,422,499

Table 212.—Imports of Anthracite and Bituminous Coal into Canada from Great Britain, by Grades and by Provinces, 1936 and 1937

(Short tons)

Destination	1936				1937			
	Anthracite			Bituminous, all grades	Anthracite			Bituminous, all grades
	Grate, egg, stove, nut, doubles, cobbles and trebles	Screenings or dust	Peas, beans and smaller sizes, n.o.p.		Grate, egg, stove, nut, doubles, cobbles and trebles	Screenings or dust	Peas, beans and smaller sizes, n.o.p.	
Prince Edward Island.	5,224			5,576	1,894			4,440
Nova Scotia.....	41,218		2,410	40,940	44,318		7,644	32,321
New Brunswick.....	70,327		3,212	22,253	69,830		2,521	14,862
Quebec.....	741,766		417,766	77,670	637,621	8,120	336,241	3,731
Central Ontario.....	32,185		19,318		10,770		15,837	52
Head of Lakes.....								
Manitoba.....	176			619	59			667
Saskatchewan.....								
British Columbia.....				662				
Canada.....	890,896		442,706	147,720	764,492	8,120	362,243	56,073

Table 213.—Imports of Anthracite, Bituminous and Lignite Coal into Canada from the United States, by Grades and by Provinces, 1936 and 1937

(Short tons)

Destination	1936					1937				
	Anthracite			Bituminous, all grades	Lignite	Anthracite			Bituminous, all grades	Lignite
	Grate, egg, stove, nut, doubles, cobbles and trebles	Screenings or dust	Peas, beans and smaller sizes n.o.p.			Grate, egg, stove, nut, doubles, cobbles and trebles	Screenings or dust	Peas, beans and smaller sizes n.o.p.		
Prince Edward Island...	1,479			111		1,153			2,509	
Nova Scotia...	7,534			2		8,606			2,773	
New Brunswick...	14,740		339	16,854		19,909		443	13,768	
Quebec...	208,196	3	53,446	645,006		286,375	6,949	62,410	1,139,641	
Ontario...	1,243,593	7,814	142,908	9,361,758		1,420,213	3,942	178,878	11,164,259	
Manitoba...	1,345		4,363	13,482	168	738		4,842	11,412	124
Saskatchewan...	27		31	847	20	37			743	125
Alberta...				1,205	33			34	1,293	28
British Columbia...		30		2,801	4,652	61			2,477	1,217
Yukon...				61					63	
Canada	1,476,914	7,847	201,087	10,042,127	4,873	1,737,084	10,928	246,607	12,338,938	1,494

Table 214.—Imports of Anthracite and Bituminous Coal into Canada from Other Countries, by Provinces, 1936 and 1937

(Short tons)

Destination	Source	1936				1937			
		Anthracite			Bituminous, all grades	Anthracite			Bituminous, all grades
		Grate, egg, stove, nut, doubles, cobbles and trebles	Screenings or dust	Peas, beans, and smaller sizes, n.o.p.		Grate, egg, stove, nut, doubles, cobbles and trebles	Screenings or dust	Peas, beans, and smaller sizes, n.o.p.	
Prince Edward Island...	Germany...					4,027			
Nova Scotia...	Germany...	792		3,249	2,321	13,169			6,955
New Brunswick...	Germany...					4,927			
Quebec...	Germany...	318,327	58	37,567	7,100	234,139		17,361	38,382
	Belgium...	37,055		7,488		8,131			
	French Indo-China...	31,103		57,599					
	Russia...					142,131		18,758	
	Netherlands...	8,951			35				
	Norway...				361				113
	Sweden...				45				
	Denmark...				124				
	Morocco...							78	
	Esthonia...				134				200
	Newfoundland...				286				
Central Ontario...	Germany...					73			8,724
British Columbia...	Netherlands...			7,280					
	Germany...	1							
	China...	1,120							
Canada		397,349	58	113,193	10,406	406,597		36,197	54,374

Table 215.—Average Imports of Coal into Canada, by Kinds and by Provinces, for the Five Years, 1933-1937

(Short tons)

Destination	Total anthracite	Total bituminous	Lignite	Total all grades
Prince Edward Island.....	6,576	4,166		10,742
Nova Scotia.....	62,804	50,539		113,343
New Brunswick.....	90,350	31,705		122,055
Quebec.....	1,861,128	854,092		2,715,220
Central Ontario.....	1,384,501	8,480,893		9,865,394
Head of Lakes.....	12,707	735,619		748,326
Total Ontario.....	1,397,208	9,216,512		10,613,720
Manitoba.....	5,826	12,283	247	18,356
Manitoba and Head of Lakes.....	18,533	747,902	247	766,682
Saskatchewan.....	46	1,021	137	1,204
Alberta.....	22	1,187	22	1,231
British Columbia.....	1,350	7,596	3,017	11,963
Yukon.....		38		38
Canada.....	3,425,310	10,179,139	3,423	13,607,872

Table 216.—Exports of Canadian Coal, by Destinations, 1936-1937

(Compiled in the External Trade Branch)

Destination	1936		1937	
	Short tons	Value	Short tons	Value
BRITISH EMPIRE				
		\$		\$
United Kingdom.....	30,867	169,122	3,587	17,935
Irish Free State.....	8,781	43,450	888	4,414
British South Africa.....	3,174	15,380	447	2,186
Bermuda.....	1,569	7,583		
British West Indies—				
Jamaica.....	52	364		
Gibraltar.....	2,098	10,385		
Newfoundland.....	94,314	429,107	104,431	480,841
Sierra Leone.....	6,804	31,743	1,683	8,415
Australia.....	7,773	47,097		
New Zealand.....	12,318	57,736		
Total British Empire.....	167,750	811,967	111,036	513,791
FOREIGN COUNTRIES				
Argentina.....	5,696	26,338		
Belgium.....	7,708	37,922	336	1,680
China.....	1,225	9,187		
Cuba.....	1,880	9,242		
Denmark.....	298	1,478		
Finland.....	471	2,355		
France.....	3,144	15,916	271	1,350
French Possessions—				
St. Pierre and Miquelon.....	5,192	23,947	3,273	15,088
Germany.....	1,584	7,773		
Greece.....	1,203	5,902		
Iceland.....	300	1,488		
Italy.....	1,504	7,481		
Japan.....	1,088	7,481		
Morocco.....	2,107	10,159		
Netherlands.....	1,925	9,457		
Norway.....	3,434	17,117		
Panama.....			1,002	4,697
Poland and Danzig.....	405	1,980		
Spain.....	379	1,895		
Sweden.....	563	2,789	254	1,270
United States.....	193,646	714,695	228,725	840,545
Alaska.....	10,122	66,009	10,371	63,458
Total foreign countries.....	243,824	980,617	244,232	928,088
Total.....	411,574	1,792,584	355,268	1,441,879

Table 217.—Annual Consumption of Coal in Canada, 1928-1937

Calendar year	Canadian*		Imported coal "entered for consumption"				Total	Per capita
			From U.S.A.	From Great Britain	Total†			
	Short tons	%	Short tons	Short tons	Short tons	%	Short tons	Short tons
1928.....	16,487,807	50.0	15,830,688	682,755	16,515,582	50.0	33,003,389	3.356
1929.....	16,387,461	48.0	16,780,452	843,502	17,724,132	52.0	34,111,593	3.401
1930.....	14,052,671	43.3	16,971,933	1,144,861	18,412,039	56.7	32,464,710	3.180
1931.....	11,682,779	47.7	11,793,798	987,442	12,828,327	52.3	24,511,106	2.362
1932.....	11,212,701	49.0	9,889,866	1,727,716	11,654,492	51.0	22,867,193	2.177
1933.....	11,456,273	51.5	8,865,935	1,942,875	10,808,962	48.5	22,265,235	2.085
1934.....	13,236,406	51.1	10,580,710	1,981,116	12,651,168	48.9	25,887,574	2.392
1935.....	13,306,303	53.1	9,618,518	1,822,500	11,735,835	46.9	25,042,138	2.290
1936.....	14,508,652	53.3	10,801,643	1,498,656	12,719,515	46.7	27,228,167	2.469
1937.....	15,172,729	51.5	12,574,574	1,211,052	14,268,585	48.5	29,441,314	2.648

* The sum of Canadian coal mine sales, colliery consumption, coal supplies to employees, and coal used in making coke etc., less the tonnage of coal exported.

† Includes small tonnages from countries other than Great Britain and the United States. Deductions have been made to take account of foreign coal re-exported from Canada and bituminous coal ex-warehoused for ships' stores.

Table 218.—Summary Statistics for 1937—Output, Exports, Interprovincial Shipments, Imports* and Coal made Available for Consumption in Canada, by Provinces

(Short tons)

Province	Canadian				Im- ported from U.S.A.	Im- ported from Great Britain	Im- ported from Ger- many	Im- ported from Bel- gium	Im- ported from Russia	Im- ported from other coun- tries	Coal available for con- sumption
	Output	Re- ceived from other prov.	Shipped to other prov.	Ex- ported							
PRINCE EDWARD IS- LAND—											
Anthracite.....					1,153	1,894	4,027				7,074
Bituminous.....		80,017		11	2,509	4,440					80,955
Total.....		80,017		11	3,662	6,334	4,027				94,029
NOVA SCOTIA—											
Anthracite.....					8,606	51,962	13,169				73,737
Bituminous.....	7,256,954	322	4,149,198	119,382	2,773	32,321	6,955				3,030,745
Total.....	7,256,954	322	4,149,198	119,382	11,379	84,283	20,124				3,104,482
NEW BRUNSWICK—											
Anthracite.....					20,352	72,351	4,927				97,630
Bituminous.....	364,714	627,725	44,131	84,942	13,768	14,862					891,996
Total.....	364,714	627,725	44,131	84,942	34,120	87,213	4,927				989,626
QUEBEC—											
Anthracite.....					355,734	981,982	251,500	8,131	160,889	78	1,758,314
Bituminous.....	3,374,558	1,104,383	75		1,139,641	3,731	38,382			313	3,452,167
Total.....	3,374,558	1,104,383	75		1,495,375	985,713	289,882	8,131	160,889	391	5,210,481
CENTRAL ONTARIO—											
Anthracite.....					1,581,981	26,607	73				1,608,661
Bituminous.....	1,224,168			1	10,215,504	52	8,724				11,448,447
Sub-bituminous.....	18,367										18,367
Lignite.....	45,095										45,095
Total.....	1,287,630			1	11,797,485	26,659	8,797				13,120,570
MANITOBA AND HEAD OF LAKES—											
Anthracite.....					26,632	59					26,691
Bituminous.....	230,943			657	960,167	667					1,191,120
Sub-bituminous.....	71,936										71,936
Lignite.....	3,172	698,227		237	124						701,286
Total.....	3,172	1,001,106		894	986,923	726					1,991,033
SASKATCHEWAN—											
Anthracite.....					66						66
Bituminous.....	59,453			253	743						59,943
Sub-bituminous.....	17,788										17,788
Lignite.....	1,049,348	1,018,253	491,273	1,950	125						1,574,503
Total.....	1,049,348	1,095,494	491,273	2,203	934						1,652,300

Table 218.—Summary Statistics for 1937—Output, Exports, Interprovincial Shipments, Imports* and Coal made Available for Consumption in Canada, by Provinces—Con.

(Short tons)

Province	Canadian				Im- ported from U.S.A.	Im- ported from Great Britain	Im- ported from Ger- many	Im- ported from Bel- gium	Im- ported from Russia	Im- ported from other count- ries	Coal available for con- sumption
	Output	Re- ceived from other prov.	Shipped to other prov.	Ex- ported							
ALBERTA—											
Anthracite.....					34						34
Bituminous.....	2,413,784	11,384	353,938	565	1,293						2,071,958
Sub-bituminous.....	506,260		155,239								351,021
Lignite.....	2,642,795		1,348,093	1,556	28						1,293,174
Total.....	5,562,839	11,384	1,857,270	2,121	1,355						3,716,187
BRITISH COLUMBIA—											
Anthracite.....					61						61
Bituminous.....	1,598,843	144,429	101,349	139,540	2,477						1,504,860
Sub-bituminous.....		47,066									47,066
Lignite.....		77,791		6,099	1,217						72,909
Total.....	1,598,843	269,286	101,349	145,639	3,755						1,624,896
YUKON—											
Bituminous.....	84				63						147
Total.....	84				63						147
NORTHWEST TERRITORIES—											
Sub-bituminous.....		82									82
Total.....		82									82
CANADA—											
Anthracite.....					1,994,619	1,134,855	273,696	8,131	160,889	78	3,572,268
Bituminous.....	11,634,379	4,648,616	4,648,616	345,426	12,338,938	56,073	54,061			313	23,738,338
Sub-bituminous.....	506,260	155,239	155,239								506,260
Lignite.....	3,695,315	1,839,366	1,839,366	9,842	1,494						3,686,967
Total.....	15,835,954	6,643,221	6,643,221	355,268	14,335,051	1,190,928	327,757	8,131	160,889	391	31,503,833

* Direct imports into each province. See text for interprovincial shipments of imported coal.

† Nova Scotia coal.

Table 219.—Canada's Coal Supply and the Coal Equivalent of Other Mineral Fuels and Water Power Used

(Thousands of short tons)

	Coal					Coke from coal	Natural Gas (b)	Fuel and Gas Oils (c)	Gasoline Sales (d)	Kero- sene (e)	Water Power	
	Anthra- cite Im- ported*	Bituminous		Lignite							EQUIVA- LENT	Pounds of coal per kilo- watt hour (f)
		Canadi- an†	Im- ported‡	Canadi- an†	Im- ported*	Im- ported *(a)						
1928.....	3,749	12,709	12,756	3,799	11	1,060	903	2,667	2,797	367	13,821	1.76
1929.....	4,020	12,485	13,690	3,902	14	1,227	1,135	3,205	3,475	328	14,620	1.69
1930.....	4,256	10,649	14,137	3,404	19	1,061	1,175	3,189	3,366	295	14,219	1.62
1931.....	3,162	8,822	9,660	2,861	6	668	1,035	2,996	3,219	291	12,461	1.55
1932.....	3,149	7,806	8,503	3,407	3	611	937	2,837	2,896	341	11,667	1.50
1933.....	3,016	8,128	7,791	3,328	3	589	926	3,012	2,803	265	12,670	1.47
1934.....	3,501	10,051	9,148	3,185	3	810	926	3,176	3,091	267	15,289	1.47
1935.....	3,443	9,783	8,288	3,523	5	633	996	3,228	3,316	194	16,801	1.46
1936.....	3,419	10,683	9,296	3,826	5	642	1,125	3,259	3,608	195	18,210	1.46
1937.....	3,488	11,515	10,779	3,658	1	472	1,288	3,734	4,154	167	18,479	1.43

*Entered for consumption.

†Sum of sales by Canadian coal mines, colliery consumption, coal supplied to employees and coal used in making coke, etc., less the tonnage exported.

‡Deductions have been made to take account of foreign coal re-exported from Canada and bituminous coal ex-warehoused for ships' stores.

(a) Tonnage imported into Canada "Entered for consumption". Based on 1 ton=13,000 B.T.U.

(b) Based on 1 ton of coal=25 M cu. ft. of natural gas.

(c) Based on 1 ton of coal=151 imperial gallons of fuel and gas oils.

(d) Based on 1 ton of coal=173 imperial gallons of gasoline.

(e) Based on 1 ton of coal=160 imperial gallons of kerosene.

(f) Based on the United States average as reported by the Edison Electric Institute.

Table 220.—World Production of Coal* 1935-1937

(Including brown coal)

(Long tons)

Country	1935	1936	1937
BRITISH EMPIRE			
Great Britain—			
Anthracite.....	6,798,415	6,525,225	6,335,776
Bituminous.....	215,453,637	221,928,387	234,074,863
Eire—			
Anthracite.....	85,738	95,214	104,966
Semi-bituminous.....	26,985	29,509	20,958
Nigeria.....	257,819	291,651	363,181
Southern Rhodesia.....	683,654	693,947	1,013,086
Union of South Africa.....	13,359,509	14,607,313	15,246,129
Canada—			
Bituminous.....	8,704,322	9,639,406	10,387,838
Sub-bituminous.....	505,737	505,567	452,018
Lignite.....	3,189,946	3,452,511	3,299,388
British Borneo—			
Brunei.....	838	184	444
Federated Malay States.....	377,441	502,823	627,890
India—			
Gondwana Coalfields.....	22,607,552	22,212,457	24,571,343
Tertiary Coalfields.....	409,143	398,364	465,043
Used by mines.....	575,000	565,000	626,000
Australia—			
Bituminous.....	10,887,954	11,370,409	12,074,274
Lignite.....	2,221,515	3,044,897	1,502,573
New Zealand—			
Bituminous.....	825,227	858,857	969,984
Brown coal.....	1,170,805	1,150,071	1,186,320
Lignite.....	119,152	131,289	121,495
Total British Empire.....	288,000,000	298,000,000	313,000,000
FOREIGN COUNTRIES			
Albania-Lignite.....	2,000	3,000	4,000
Austria—			
Bituminous.....	256,484	240,480	226,84
Brown coal.....	2,923,765	2,851,446	3,190,571
Belgium—			
Anthracite and semi-anthracite.....	5,158,236	5,981,898	6,588,307
Bituminous.....	20,929,493	21,445,070	22,799,348
Bulgaria—			
Anthracite.....	2,188	2,286	2,502
Bituminous.....	89,318	98,379	116,021
Lignite.....	1,541,239	1,551,206	1,704,763
Czechoslovakia—			
Bituminous.....	10,722,420	12,039,975	16,512,541
Brown coal.....	14,874,878	15,696,878	17,612,727
France—			
Saar.....	(d) 1,673,228		
Other districts—			
Anthracite and bituminous (a).....	45,482,687	44,513,214	43,618,141
Lignite.....	892,409	928,333	999,522
Germany—(e)			
Bituminous.....	140,744,275	155,782,899	181,598,670
Brown coal.....	144,748,744	158,847,655	181,791,547
Greece—			
Lignite.....	91,163	103,953	129,013
Hungary—			
Bituminous.....	809,825	813,783	903,000
Brown coal.....	6,146,993	6,501,139	7,928,000
Lignite.....	464,588	491,652	
Lignite (dehydrated).....	118,992	122,277	†
Italy—			
Anthracite.....	69,042	78,709	93,559
Bituminous.....	366,477	714,696	855,654
Brown coal.....	536,867	756,425	1,042,502
Jugoslavia—			
Bituminous.....	393,624	434,384	432,405
Brown coal.....	3,034,480	3,017,941	3,475,749
Lignite.....	936,659	952,916	1,046,889
Netherlands—			
Bituminous.....	11,690,250	12,600,340	14,095,084
Brown coal.....	84,843	87,377	140,798
Poland—			
Bituminous.....	28,091,945	29,278,040	35,646,160
Brown coal.....	18,170	13,305	18,616
Portugal—			
Anthracite.....	202,139	204,450	228,260
Bituminous.....	5,390	8,165	17,168
Brown coal.....	19,476	20,395	22,439
Roumania—			
Anthracite.....	16,935	3,649	3,587
Bituminous.....	256,962	284,299	294,896
Brown coal.....	1,478,848	1,434,775	1,616,171
Lignite.....	161,589	210,645	232,870

Table 220.—World Production of Coal* 1935-1937—Concluded

(Including brown coal)

(Long tons)

Country	1935	1936	1937
FOREIGN COUNTRIES—Con.			
Russia—			
Anthracite.....	25,147,000	27,703,000	120,643,000
Bituminous.....	68,589,000	78,974,000	
Lignite.....	13,602,000	17,333,000	
Spain—			
Anthracite.....	690,000	†	†
Bituminous.....	6,214,994	†	†
Brown coal.....	299,028	†	†
Spitzbergen and Bear Island.....	697,607	771,471	770,000
Sweden.....	416,813	448,647	453,193
Switzerland (b).....	4,000	3,000	4,000
Algeria.....	37,316	6,791	13,374
Belgian Congo.....	11,136	13,682	35,917
Morocco (French)			
Anthracite.....	51,864	49,621	105,458
Mozambique.....	15,250	8,161	†
Greenland.....	6,000	4,397	†
Mexico.....	1,124,847	1,276,000	†
United States—			
Anthracite.....	46,570,342	48,731,728	46,300,387
Bituminous and lignite.....	332,476,002	392,042,770	395,049,196
Brazil.....	744,998	651,738	750,742
Chile.....	1,869,929	1,845,194	1,969,384
Colombia (estimated).....	200,000	277,534	325,000
Peru—			
Anthracite.....	2,422	3,479	†
Bituminous.....	81,279	88,246	†
Venezuela (c).....	5,000	7,000	11,737
China.....	12,000,000	12,000,000	†
Dutch East Indies.....	1,093,407	1,129,078	1,342,060
Formosa.....	1,572,000	1,570,000	1,716,000
French Indo-China—			
Anthracite.....	1,714,400	2,116,108	2,229,206
Bituminous.....	33,300	34,876	42,348
Brown coal.....			
Japan—			
Semi-anthracite and bituminous.....	37,166,085	37,466,000	†
Brown coal.....	106,812	†	†
Karafuto.....	1,491,709	†	†
Korea—			
Anthracite.....	1,062,283	1,035,240	†
Lignite.....	905,296	1,210,712	†
"Manchoukuo".....	14,000,000	15,000,000	†
Philippine Islands.....	†	5,331	4,580
Turkey in Asia—			
Bituminous.....	2,303,526	2,262,345	2,270,435
Lignite.....	72,196	94,306	113,252
Total Foreign countries.....	1,020,000,000	1,120,000,000	1,200,000,000
Grand Total.....	1,310,000,000	1,420,000,000	1,510,000,000

*Date for 1935-1937 obtained from "The Mineral Industry of the British Empire and Foreign Countries."

† Information not available.

(a) Includes about 6,000,000 tons of anthracite each year.

(b) United States Bureau of Mines estimate.

(c) Excluding production in government owned mines.

(d) January to February 17th, only, after which data production is included with that of Germany.

(e) Including production of Saar from February 18, 1935.

THE COKE AND ARTIFICIAL GAS INDUSTRY

The Canadian output of gas-house, by-product and bee-hive coke in 1937 rose to 2,570,355 tons worth \$18,466,068 from the 1936 total of 2,404,793 tons at \$16,710,008. The 1937 output included 2,334,556 tons of by-product and gas-house coke, and 235,829 tons from gas retorts. In addition, 62,015 tons of petroleum coke were recovered as a by-product in the petroleum refining industry.

Sales of manufactured gas by producers totalled 15,289,839 thousand cubic feet of which 8,700,475 thousand cubic feet were from by-product ovens and 6,589,364 thousand cubic feet were from gas works. Most of the remaining gas was used as a fuel in the producing plants or in their associated metallurgical works. These figures do not include 52,209 thousand cubic feet of Pintsch oil gas for lighting railway cars, 5,779,059 thousand cubic feet of still gas recovered at petroleum refineries, and some blast furnace and producer gas which was recovered and used by the producers but for which no records are available.

Manufactured gas was sold to 476,965 customers in 1937. The length of distributing mains was 3,729 miles. The calorific value of the gas sold ranged from 450 to 533 B.T.U. per cubic foot.

The imports of coke made from coal in 1937 declined to 417,733 tons from the preceding year's total of 612,558 tons; exports, however, increased 18,744 tons to 36,959 tons. Importations of petroleum coke were recorded at 119,503 tons compared with 88,602 tons in 1936.

Exports of petroleum coke amounted to 16,967 tons; a year ago, 14,548 tons were exported. Foreign petroleum coke imported into Canada and re-exported in 1937 totalled 32,990 tons.

Table 221.—Materials Used in the Coke and Gas Industry in Canada, 1936 and 1937

Materials	1936		1937	
	Quantity	Cost at works	Quantity	Cost at works
		\$		\$
Bituminous coal carbonized in ovens or retorts—				
(a) Canadian.....short ton	1,057,099	4,278,820	1,154,315	4,198,788
(b) Imported.....short ton	2,298,240	10,682,891	2,423,243	11,440,385
Bituminous coal for making water gas—				
Imported.....short ton	3,159	21,772	2,392	17,839
Coke for gas-making—				
(a) Purchased.....short ton	4,573	43,311	3,907	36,620
(b) Companies' own make.....short ton	92,665	664,429	92,515	662,053
Oil used for enriching water gas.....imp. gal.	3,907,255	277,467	4,017,360	299,922
Oil used for making oil gas.....imp. gal.	635,122	53,572		
Absorbing and wash oil.....imp. gal.	261,734	30,686	228,336	26,550
Caustic soda.....pound	683,065	17,270	551,619	12,481
Lime.....tons	2,361	16,900	2,735	27,529
Water.....\$		12,859		16,950
Oxide or purifying materials.....tons		41,291		40,414
Sulphuric acid, 66° Bé.....pound	39,939,799	312,270	46,357,679	328,521
All other materials.....\$		132,033		109,905
Total Cost.....\$		16,585,571		17,217,957

Table 222.—Production in Canada, Imports and Exports of Coke and Its By-Products, 1936 and 1937

	1936		1937	
	Quantity	Value	Quantity	Value
		\$		\$
Coke				
PRODUCTION—by provinces—				
Nova Scotia, New Brunswick and Quebec.....tons	775,270	4,655,468	853,122	5,548,042
Ontario.....tons	1,441,833	10,807,611	1,504,334	11,522,965
Manitoba, Alberta and British Columbia.....tons	187,690	1,246,929	212,929	1,395,061
Total.....tons	2,404,793	16,710,008	2,570,385	18,466,068
IMPORTS.....tons	612,858		417,733	
EXPORTS.....tons	18,215	111,417	36,959	236,496
AVAILABLE FOR CONSUMPTION.....tons	2,999,436		2,951,159	
Other Products				
PRODUCTION—				
Ammonium sulphate.....tons	26,828	582,816	29,788	683,556
Gas: Sales.....M cu. ft.	15,321,832	15,163,664	15,289,839	14,732,531
(b) Used in own plants.....M cu. ft.	16,665,381	2,165,284	18,330,349	2,429,972
(c) Used in associated metallurgical works.....M cu. ft.	10,181,379	1,324,475	10,652,774	1,398,776
(d) Gas otherwise accounted for, but not sold.....M cu. ft.	519,077	102,671	235,652	62,057
(e) Not accounted for.....M cu. ft.	1,795,319	1,463,265	1,622,708	1,299,473
Benzol.....imp. gal.	2,935,917	473,948	2,980,697	590,302
Toluol and xylol.....imp. gal.	724,982	280,123	731,408	270,557
Other light oils.....imp. gal.	2,862,815	242,036	3,824,692	308,546
Tar.....imp. gal.	26,804,438	1,340,754	27,789,569	1,440,578
Ammonia liquor.....pound N.H. ₃	1,779,748	17,797	1,618,661	16,187
All other products.....		5,057		4,326
IMPORTS—				
Ammonium sulphate.....tons	5,729	148,956	3,230	82,440
Coal tar and pitch.....		162,060		203,254
EXPORTS—				
Ammonium sulphate.....tons	83,835	1,802,818	56,485	1,212,258
Coal tar and pitch.....gal.	3,032,501	155,870	2,140,349	135,531

THE NATURAL GAS INDUSTRY

The Canadian production of natural gas in 1937 amounted to 32,380,991 thousand cubic feet worth \$11,674,802 compared with 28,113,348 thousand cubic feet valued at \$10,762,243 in the preceding year and, 24,910,786 thousand cubic feet at \$9,363,141 in 1935.

Production from New Brunswick wells totalled 576,671 thousand cubic feet; in the previous year, 606,246 thousand cubic feet were produced. New Brunswick's output was obtained from wells in the Stony Creek field, near Moncton and the gas was piped to Moncton and Hillsboro where approximately 5,600 consumers were served. There were 37 natural gas wells in operation in this province at the end of 1937.

Ontario's output advanced to 10,746,334 thousand cubic feet or 7.4 per cent above the preceding year's total. Col. R. B. Harkness, Commissioner of Gas for Ontario, summarizes the developments in this province in 1937 as follows:

"For four consecutive years the production of natural gas in Ontario has shown an increase. It has now reached a "seventeen year high". The increased production is from the new fields, Declute, Dawn, and Brownsville, which are still in the development stage. The number of consumers shows an increase as well as does the quantity used per consumer. This may be the result of improved business conditions, but it is certain, from incomplete records of sales of appliances, that natural gas is being used for more purposes than ever before.

The capital invested in the industry shows a large increase, and the number of men employed and wages paid shows an "all time high". These items appear also to follow the trend of business. Economies appear to be practiced in times of business depression and expansions are made in "good times".

In 1937, the greatest activity was in the Brownsville field, where an intense drilling program was carried out. Wells average nearly three million cubic feet open flow each. The field extends into the north-west part of Bayham township, Elgin county, making the third distinct gas field in this township, viz., Vienna, Eden and Brownsville. The Vienna field is 27 years old and now nearly exhausted.

The Declute field is fairly well outlined on the east and west. It may yet extend to the north, although dry holes and small wells would indicate its present limit in that direction. To the south it undoubtedly extends under the waters of Lake Erie. This field has proved to be a major gas field, and though small in area, the wells are very large in open flow. The Brownsville discovery has encouraged drilling over a wide area.

The Haldimand field for the first time shows a decrease in the number of producing wells, as well as in the number of wells drilled in the year. The percentage of dry holes would indicate that the field has been almost completely drilled.

The Welland field is being given some attention after a period of many years when no wells were drilled.

Exploratory drilling is, as noted above, on the increase and great tracts of land have been leased in new territories.

The exploratory work being carried out in Chatham township is showing considerable success after the drilling of a number of dry holes. The success in the Brownsville field has encouraged exploratory drilling in East Nissouri, North Dorchester, Bayham, and Malahide townships, where new fields are being sought in the Guelph formation. Two wells in North Easthope township proved non-productive. Drilling north of the old Mersea oil and gas field in Tilbury North and West has been disappointing, as has been an attempt to enlarge the Dawn field. Drilling continues in two wells which have been drilled into the pre-Cambrian, one in Beverly township and one in Nassagaweya township. Some success has attended drilling in Prince Edward county in the Town of Picton. These wells are very small in open flow and low in rock pressure.

Gas service has been extended to several small villages along the pipe line from the Dawn gas field to London. A second pipe line was laid into the Brownsville field; this one was from the Town of Aylmer. A purification plant was built in the Village of Springfield, similar to the Brownsville plant described in last year's report. The line and purification plant are owned by the Central Pipe Line Company, Limited."

The natural gas industry in Ontario in 1937 included the activities of 182 operating, distributing and drilling firms who reported a total capital employment of \$48,891,691. These firms employed 1,456 salaried employees and wage-earners who received salaries and wages totalling \$1,659,068. The fuel used by these operators was valued at \$56,051; of which natural gas accounted for 83.7 per cent.

Saskatchewan's natural gas production rose to 100,380 thousand cubic feet from the preceding year's total of 90,839 thousand cubic feet. This production was obtained principally from the Lloydminster well; in addition there was a small output from the Colony well. The former well supplied gas to approximately 370 consumers in Lloydminster while gas from the latter well was used in drilling operations.

Alberta wells produced 20,955,506 thousand cubic feet in 1937; during the preceding year, 17,407,820 thousand cubic feet were produced. These figures include only the natural gas consumed for industrial and domestic purposes and do not take into account the waste gas burned in the Turner Valley field and the gas piped to the Bow Island field for storage.

The largest natural gas producing area in Canada is located in the Turner Valley field, Alberta, about 35 miles southwest of Calgary. The consumption of Turner Valley gas for industrial (including drilling) and domestic use in 1937 was 14,101,222 thousand cubic feet compared with 10,593,321 thousand cubic feet a year ago and 9,718,000 thousand cubic feet in 1935. There were approximately 23,500 consumers in Calgary, Lethbridge and the district who were served with this gas in 1937; in addition, a considerable quantity was used in the field for drilling purposes. Following the practice of preceding years, a large quantity of Turner Valley gas was piped to the Bow Island field for repressuring wells in that area. Approximately 12,245,000 thousand cubic feet of this gas has been piped into these wells since 1930.

The city of Medicine Hat consumed 2,262,552 thousand cubic feet of natural gas during the year as against 2,460,523 thousand cubic feet in 1936. Some 2,500 consumers were supplied with gas from the Medicine Hat field in 1937. The Redcliff field, about two miles west of Medicine Hat served about 260 industrial and domestic users who consumed 686,329 thousand cubic feet of gas.

Edmonton is supplied with gas from the Viking field which is located approximately 80 miles southeast of the city. This field provided gas, in 1937, for 10,700 consumers in Edmonton and 488 users outside the city. Twenty-two wells were in operation in the Viking field in 1937.

The Maple Leaf well in the Fabyan field furnished gas to approximately 300 consumers in Wainwright in 1937.

There were 100 wells in Alberta producing natural gas only on Dec. 31, 1937; a year ago, 95 wells were active. Capital employed by the companies operating in this industry in Alberta during 1937 was \$24,710,670 compared with \$25,063,756 in 1936. Employment was furnished during the year under review to 469 employees who received salaries and wages totalling \$695,901. Fuel and electricity used in 1937 cost the operating companies \$4,322.

At Fort Norman, in the Northwest Territories, 1,500 thousand cubic feet of natural gas were used for power purposes in 1937.

Canada imported 114,275 thousand cubic feet of mixed gas (natural and artificial) by pipeline from the United States during the year; this gas was valued at \$74,799. In 1936, importations totalled 118,056 thousand cubic feet worth \$75,985.

The Canadian natural gas industry in 1937 was represented by 218 operators who reported a total capital employment of \$75,611,107. These operators employed 2,028 salaried employees and wage-earners who received a total remuneration of \$2,488,125. The cost of fuel and electricity used during the year was \$75,690.

Table 223.—Production of Natural Gas in Canada, by Provinces, 1928-1937

Year	New Brunswick		Ontario		Manitoba		Alberta		Canada	
	M cu. ft.	Value	M cu. ft.	Value	M cu. ft.	Value	M cu. ft.	Value	M cu. ft.	Value
		\$		\$		\$		\$		\$
1928.....	660,981	324,344	7,632,800	4,535,312	200	60	14,288,605	3,754,466	22,582,586	8,614,182
1929.....	678,456	333,002	8,586,475	4,959,695	600	180	19,112,931	4,684,247	28,378,462	9,977,124
1930.....	661,975	325,751	7,965,761	5,034,828	600	180	20,748,583	4,929,226	29,376,919	10,289,985
1931.....	655,891	323,184	7,419,534	4,635,497	600	180	17,798,698	4,067,893	25,874,723	9,026,754
1932.....	662,452	326,191	7,386,154	4,719,297	600	180	15,370,968	3,853,794	23,420,174	8,899,462
1933.....	618,033	302,706	7,166,659	4,523,085	600	180	15,352,811	3,886,263	23,138,103	8,712,234
1934.....	623,601	306,005	7,682,851	4,741,368	600	180	14,841,491	3,707,276	(a)23,162,324	(a)8,759,652
1935.....	615,454	303,886	8,158,825	4,938,084	600	180	16,060,349	4,113,436	(b)24,910,786	(b)9,353,141
1936.....	606,246	298,819	10,006,743	6,052,294	600	180	17,407,820	4,376,720	(c)28,113,348	(c)10,762,243
1937.....	576,671	283,922	10,746,334	6,588,798	600	180	20,955,506	4,766,437	(d)32,380,991	(d)11,674,802

(a) Includes production in Saskatchewan of 13,781 M cu. ft. at \$4,823.

(b) Includes production in Saskatchewan, of 75,558 M cu. ft. at \$7,555.

(c) Includes production in Saskatchewan at 90,839 M cu. ft. at \$33,985 and in the Northwest Territories of 1,100 M cu. ft. at \$245.

(d) Includes production in Saskatchewan at 100,380 M cu. ft. at \$35,130 and in the Northwest Territories of 1,500 M cu. ft. at \$335.

Table 224.—Production of Natural Gas in Canada, by Months, 1937

	New Brunswick	Ontario	(a) Manitoba	Saskatchewan	Alberta	CANADA
	M cu. ft.	M cu. ft.	M cu. ft.	M cu. ft.	M cu. ft.	M cu. ft.
January.....	67,813	1,194,640	50	17,659	3,195,979	4,476,141
February.....	67,845	1,140,411	50	14,779	2,598,469	3,821,554
March.....	65,788	1,117,123	50	11,665	1,992,147	3,186,773
April.....	64,111	937,775	50	6,498	1,604,708	2,613,142
May.....	48,303	723,575	50	3,677	1,132,334	1,907,939
June.....	33,947	568,068	50	2,431	891,356	1,495,852
July.....	26,778	528,138	50	1,879	850,464	(b)1,407,809
August.....	22,631	498,283	50	2,854	904,582	(b)1,428,900
September.....	26,225	734,357	50	3,437	1,069,176	(b)1,833,745
October.....	41,542	874,829	50	6,976	1,631,390	2,554,787
November.....	52,005	1,063,788	50	12,345	2,219,256	3,347,444
December.....	59,683	1,365,347	50	16,180	2,865,645	4,306,905
Total.....	576,671	10,746,334	600	100,380	20,955,506	32,380,991

(a) Estimated.

(b) Includes production from Fort Norman, Northwest Territories.

Table 225.—Natural Gas Production in Ontario, by Fields, 1936 and 1937 (a)

County	Field	1936	1937
		M cu. ft.	M cu. ft.
Essex.....	Kingsville.....	3,531,870	3,245,333
Kent.....	Tilbury.....		
	Declute.....	1,298,362	1,512,300
	Dover.....	842,362	636,552
Lambton.....	Dawn and Oil Springs.....	1,436,919	1,890,874
Oxford.....	Brownsville Field (Dereham.....)	207,914	200,974
Elgin.....	Bayham.....		
Elgin.....	Norfolk.....	462,653	441,375
Norfolk.....	Lincoln.....	1,735,171	1,784,257
Haldimand.....	Haldimand.....		
Wentworth.....	Wentworth.....	130,747	112,482
Brant.....	Onondaga.....	400	2,763
Bruce.....	Amabel.....	286,345	298,493
Welland.....	Welland.....	14,000	14,000
Wells in surface drift.....	Howard and Harwich.....	60,000	60,000
Private wells.....			
Total produced.....		10,006,743	10,746,334
Value.....		\$ 6,054,294	\$ 6,588,798
Imported mixed gas.....		113,721	113,495
Total distributed.....		10,120,464	10,859,829

(a) Prepared by the Ontario Department of Mines.

Table 226.—Number of Gas Wells in Canada, by Provinces, 1935-1937

		New Brunswick	Ontario	Manitoba	Saskat- chewan	Alberta	Canada
Productive wells at beginning of year...	1935	30	2,869	6	1	92	2,998
	1936	35	2,998	6	1	94	3,134
	1937	35	3,055	5	1	95	3,191
Number of productive wells drilled . . .	1935	1	201		2		204
	1936	1	165			1	167
	1937	2	135				137
Number of dry wells drilled	1935		88		2		90
	1936		89				89
	1937	1	66			2	69
Number of wells abandoned	1935		48			2	50
	1936	1	80				81
	1937		98				98
Productive wells at end of year	1935	35	2,998	6	1	94	3,134
	1936	35	3,055	5	1	95	3,191
	1937	37	3,065	5	3	100	3,210

Table 227.—Natural Gas Wells in Ontario, by Townships, 1936 and 1937

Township	1936				1937			
	No. of producing wells in operation Dec. 31, 1935	No. of wells abandoned this year	No. of dry wells drilled this year	No. of producing wells drilled this year	No. of producing wells in operation Dec. 31, 1936	No. of wells abandoned this year	No. of dry wells drilled this year	No. of producing wells drilled this year
Amabel	2		2	2	2			
Bayham	45	5	4	10	49	5		12
Bertie	95		1	2	96		3	6
Binbrook	53	1			52			
Caistor	64	2			62			
Canboro	185	13		3	175	11	1	5
Caledon, East	5							
Cayuga, North	191	1	13	13	200	11	6	8
Cayuga, South	55		3	5	60	2		
Charlotteville	13		1	2	15			
Chatham			4	1			4	7
Crowland	26				26			2
Dawn	22		5	6	23			
Dereham			4	11			3	32
Dorchester, North		3					1	
Dover, East	22		1	1	22		2	
Dover, West								
Dunn	49	2		2	51			
Easthope, North							2	
Enniskillen	4				4			
Gainsboro	13	5	1	3	13			
Glanford	11	1			12			
Gosfield, South	23	1		2	21		1	1
Hastings							2	
Houghton	4		1		4			
Humberstone	57				57	1		
Keppell			1					
Malahide	1		1		1		1	
Marysburgh								5
Mersea	3				3			
Middleton	47			7	49	1	2	1
Moulton	112	6	3	11	107	14	2	2
Nissouri, East							1	
Oneida	69	2	1	3	71	3		3
Onondaga	44	7		7	41	5		4
Rainham	282	5	7	8	291	7	1	10
Raleigh	37	5	3	2	32	1	4	7
Romney	139	2	1		136			
Sarnia	13				13			
Seneca	183	6			177	2	1	1
Sherbrooke	12				12	1		
Sombra			1					
Tilbury East	145	1		1	144	4	2	2
Tilbury, North							1	
Tilbury, West							1	
Townsend	2				2			
Tuscarora	76	3	2	9	84	8		2
Wainfleet	25	4	3	3	27			4
Walpole	361	3	22	45	412	7	12	15
Walsingham, N.	13				13			
Walsingham, S.	13				13			
Windham	10		1		10			
Willoughby	41				41	1		
Woodhouse	82	2	2	6	83	4	2	4
Private wells	300				300			
Surface wells	69				69			
Total	2,998	80	89	165	3,055	98	66	135

Table 228.—Capital Employed in the Natural Gas Industry in Canada, by Provinces, 1936 and 1937

	1936			1937		
	Ontario	Alberta	Canada	Ontario	Alberta	Canada
	\$	\$	\$	\$	\$	\$
CAPITAL EMPLOYED AS REPRESENTED BY—						
Cost of lands, buildings, plant, machinery and tools.....	39,513,519	23,141,229	64,326,924	38,990,404	22,584,231	63,354,263
Cost of supplies and stock on hand.....	2,631,419	162,233	2,863,194	430,127	153,026	653,090
Cash, trading and operating accounts and bills receivable.....	8,566,085	1,760,294	10,476,450	9,471,160	1,973,413	11,603,754
Total.....	50,711,023	25,063,756	77,666,568	48,891,691	24,710,670	75,611,107

†Includes data for New Brunswick, Manitoba and Saskatchewan.

Table 229.—Employees, Salaries and Wages in the Natural Gas Industry in Canada, by Provinces, 1936 and 1937

Province	*Average number of employees				Salaries and wages		
	Salaried employees		Wage-earners	Total	Salaries	Wages	Total
	Male	Female					
					\$	\$	\$
1936							
New Brunswick.....	14	6	66	86	39,524	75,515	115,039
Ontario.....	513	131	872	1,516	902,619	750,620	1,653,239
Manitoba.....	1	1	1	3	591	629	1,220
Saskatchewan.....	2		5	7	3,000	1,448	4,448
Alberta.....	93	36	334	463	191,772	491,200	682,972
Canada.....	623	174	1,278	2,075	1,137,506	1,319,412	2,456,918
1937							
New Brunswick.....	14	8	66	88	41,250	79,839	121,089
Ontario.....	503	126	827	1,456	899,716	759,352	1,659,068
Saskatchewan.....	6		9	15	5,040	7,027	12,067
Alberta.....	95	35	339	469	196,014	499,887	695,901
Canada.....	618	169	1,241	2,028	1,142,020	1,346,105	2,488,125

*See footnote on page 41.

Table 230.—Casing Used in the Natural Gas Industry in Canada, 1937

Size	Weight	Length	Size	Weight	Length
Inches	Pounds	Feet	Inches	Pounds	Feet
2.....	10,838	5,419	6 1/2.....	246,348	17,232
3.....	3,300	550	6 3/4.....	120,852	5,573
4.....	10,240	640	8.....	44,381	1,015
4 1/2.....	8,198	965	8 1/2.....	79,144	3,171
4 3/4.....	63,000	4,200	10.....	96,660	2,422
5.....	27,073	2,499	10 1/2.....	7,898	195
5 1/2.....	95,184	5,261	12.....	110,618	2,207
5 3/4.....	99,380	8,459	15.....	13,510	193
6.....	9,861	519	Total.....	1,046,485	60,520

PEAT

Peat production in Canada during 1937 declined to 478 tons valued at \$2,676 from the preceding year's total of 1,341 tons at \$7,376. The 1937 output was obtained from Ontario bogs.

Table 231.—Production of Peat (for Fuel) in Canada, 1928-1937

Year	Tons	Value
		\$
1928.....	1,497	5,845
1929.....	2,607	13,339
1930.....	2,847	10,932
1931.....	1,674	7,033
1932.....	3,248	7,593
1933.....	1,131	3,449
1934.....	1,878	7,343
1935.....	1,340	5,761
1936.....	1,341	7,376
1937.....	478	2,676

THE PETROLEUM INDUSTRY IN CANADA

Including (1) Production of Crude Petroleum; and (2) Petroleum Products.

1. Production of Crude Petroleum

Crude petroleum production in Canada during 1937 advanced to 2,943,750 barrels from the preceding year's total of 1,500,374 barrels and the 1935 output of 1,446,620 barrels.

Production from New Brunswick wells totalled 18,089 barrels in 1937 compared with 17,112 barrels in 1936. The 1937 output was obtained, as usual, from the Stony Creek field near Moncton. This crude oil was treated in a small topping plant at Weldon and gasoline and fuel oil were recovered.

There has been little variation in Ontario's petroleum production during the past three years; in 1937 the output was 165,205 barrels averaging \$2.15 a barrel; in the previous year 165,495 barrels at \$2.12 per barrel were produced, while in 1935 the output was 165,041 barrels with an average of \$2.10 a barrel.

Col. R. B. Harkness, Commissioner of Gas for Ontario, commented on the Ontario crude petroleum industry as follows:

"The total number of oil wells in the Province shows a slight increase in spite of the fact that more wells are abandoned than drilled. This is due to the fact that old and forgotten wells are constantly being found and revived; after they lie idle for a number of years, oil appears to accumulate and, on being pumped, they produce a considerable amount of oil. In Petrolia, this new production from old wells is not maintained as it has been in Bothwell during the past five years. In the latter case it has been remarkable. The field was discovered about the year 1862 and experienced a tremendous boom at the end of 1866. Approximately 230 wells were producing over an area of approximately 3,000 acres. In the centre of this area, where the wells were most productive, they were drilled as close as drilling rigs could be placed. At the time of the Fenian Raid in 1866, fearing a rupture between the countries, the American operators left the country, and their properties lay idle. It so happened that this coincided with the opening up of the Petrolia field, which put a veritable flood of oil on the limited market, and the price of oil declined almost to the vanishing point. Most of the wells in the Bothwell field had been drilled into the lower water, and with so many idle wells, the field "went to water". It was closed down until about 1896 when Mr. F. J. Carmen opened up the western pool, which has been producing continuously since that date. This revived portion is the eastern pool, in the area where Zone, Mosa, Orford, and Aldborough townships meet. Many of the wells opened up in the past five years had been idle since 1866; most of them have been re-drilled as the casing has practically disappeared through corrosion."

Fifteen drilling rigs were in operation in Ontario during 1937. The capital employed by the operators of these rigs was \$37,500. Twenty-eight men were employed during the year who received wages totalling \$14,250. In all, 28 dry holes and 38 producing oil wells were drilled. The total footage drilled in 1937 was 36,000.

A new high record was set up in Alberta's crude petroleum output in 1937, when 2,749,085 barrels were produced compared with 1,312,368 barrels in the preceding year. This increase was due to the successful drilling into production of new wells in the west flank at the south end of the Turner Valley field. Light crude oil was produced from these wells and, although the initial output was large, it was materially increased after the wells were acid-treated.

Production in the Turner Valley field recorded a sharp advance from June onwards and, on Sept. 15th, the large refineries found it necessary to reduce their purchases to 65 per cent of the capacity of each well. On Nov. 1st, a further cut to 45 per cent was made while, on Nov. 15th, a reduction to 35 per cent of the potential output was enforced. Despite this curtailment, output in November was maintained at a high rate and rose to a new monthly record in December with the bringing in of four new wells.

Four natural gasoline absorption plants were in operation in Alberta during 1937. Two of these plants are owned by the Royalite Oil Company Limited. The Gas and Oil Products Limited operate a plant in the South Turner Valley field. A new plant was completed by the British American Oil Company in 1936. The total output of natural gasoline from these four plants in 1937 was 653,887 barrels; in the previous year, 597,261 barrels were produced.

During the year drilling operations were in progress on 88 wells in this province and approximately 289,000 feet were drilled. Twenty-eight wells were brought into production in 1937 and six dry wells were drilled. In the previous year, drilling activities were reported on 41 wells and the total footage drilled was 94,000. One hundred and fifty-eight wells were in operation in Alberta at the close of 1937 and 52 other wells were being drilled in the Turner Valley, Wainwright-Ribstone, New Valley, Coutts, Taber, Watson and other fields. Alberta operators reported the use of 427,390 feet of casing, weighing 7,575 tons; a year ago, 137,895 feet, weighing 2,364 tons were used. The casing used in 1937 was valued at \$907,734 compared with the previous year's valuation of \$264,581. The capital employed by the 101 firms operating in Alberta during 1937 amounted to \$41,055,515. Employment was furnished by these firms to 1,404 employees who received salaries and wages totalling \$2,186,084. Fuel and electricity used in 1937 cost \$440,955.

Mr. J. L. Irwin, Statistician, Alberta Department of Lands and Mines, summarizes activities in the province as follows:

"Crown leases of the petroleum and natural gas rights active in Alberta at the end of 1937 numbered 6,466, covering an area of 971,312.48 acres, as compared with 3,838 leases with an acreage of 630,148.35 at the close of 1936.

"The prophecy made regarding an intensive search this year into the far corners of the earth for new oil-producing areas will without question be evidenced during 1938 in Alberta.

"The incentive is offered not only by popular amendments to both the petroleum and prospecting regulations made last year, but also by the fact of the province's greatly increased oil recoveries in 1937 and the knowledge that Alberta is underlaid with an immense petroliferous formation which has been proven by the drilling of many wells over a wide area.

"Crude producing wells from the limestone in southern Turner Valley numbered 35 at the beginning of the new year, with a total potential production of 26,803 barrels daily, average yield per well being, 766 barrels per day.

"The 35 producing wells in the southern end of Turner Valley are responsible for the spectacular advance made during 1937 in Alberta's oil industry. They are all located in an area approximately three miles in length from north to south and about a mile in breadth.

"To this most satisfactory progress there now comes a new encouragement in the improved process of acidizing producing wells with a view to securing increased production. The cost of such processing is insignificant in comparison to results obtainable and returns have so far proved generous in the extreme.

"Expenses involve the installation of tubing in a well plus the purchase of acid. The amount used is generally around 5,000 to 6,000 gallons. The total cost of this processing is generally recoverable by only a few days' increased production.

"The acid, possessing a hydrochloric base and containing an inhibitor for the protection of the metal tubing from corrosion, is injected into the wells by means of pumps. On reaching the productive horizon it removes obstructions from the porosity of the limestone.

"The results of acidization have been most spectacular. Producing wells in the new zone have been increased, as a result of this form of processing, to two or three times their original potential capacity and many have been subjected to a second treatment.

"With the great advancement made in Turner Valley's development the question of conservation of gas has now become a factor of the greatest importance. The need for such a measure is generally recognized and carries the endorsement of a large majority of the oil producers in that field.

"With this necessity becoming increasingly urgent negotiations with the Dominion Government have been carried on by the Government of Alberta with a view to amending the transfer agreement so that the province may acquire the power to put a conservation programme into effect.

"Such an amendment has been finally agreed upon and legislation has been effected with a view to stopping the enormous wastage of the past. A conservation board is to be appointed and names of the personnel are to be published shortly.

"The feeling that such a measure is imperative and that additional wastage of gas must be prevented is strongly shown by all who are interested in the developments of Alberta's most important industry."

In the Northwest Territories, near Fort Norman, Discovery No 1 and No 2 wells were operated during 1937 and produced 11,371 barrels of crude petroleum; a year ago, 5,399 barrels were produced. This oil, which ranged from 38° to 41° Bé, was treated at a small refinery near Fort Norman and a considerable part of the gasoline and fuel oil was used in connection with mining operations in the Great Bear Lake area. Prior to 1937, this oil was shipped in drums; during the year, however, tanker barges were built and an 8½ mile pipeline was constructed from the foot of the St. Charles rapids on the south side of the Great Bear river parallel to the portage road to the government dock at the head of the river. From the latter, a 2,000 barrel tanker barge carries the oil 225 miles across Great Bear Lake.

There were 280 firms operating and drilling oil wells in Canada during 1937; capital employed by these operators totalled \$42,147,521. This industry furnished employment to 1,620 salaried employees and wage-earners, who received a total remuneration of \$2,340,359. The cost of fuel and electricity used during the year was \$471,187 while process supplies necessitated a further expenditure of \$638,779.

Petroleum and its products exported from Canada in 1937 were valued at \$1,531,447, or 9.4 per cent below the 1936 total. Approximately 31.0 per cent of the 1937 exports consisted of fuel oil and 26.2 per cent of gasoline and naphtha.

Canada imported petroleum, asphalt and their products to a value of \$59,861,942 in 1937 compared with \$50,394,304 in the preceding year and, \$44,627,414 in 1935.

Imports of crude petroleum during 1937 amounted to 1,362,015,213 imperial gallons; the United States supplied 74.2 per cent of this quantity; Venezuela, 9.6 per cent; Colombia, 9.4 per cent and Peru, 6.8 per cent. Quebec received 41.0 per cent of the total importations of crude petroleum; Ontario, 25.3 per cent; British Columbia, 15.1 per cent; Nova Scotia, 11.9 per cent; Saskatchewan, 3.2 per cent; Alberta, 2.7 per cent and Manitoba, 0.8 per cent.

Receipts of gasoline, including casinghead, during 1937 rose to 72,478,101 imperial gallons from the 1936 total of 60,987,262 imperial gallons. The 1937 gasoline imports were obtained principally from the following sources—the United States, 53,972,140 imperial gallons; Peru, 17,743,112 imperial gallons; Roumania, 735,000 imperial gallons; Alaska, 21,167 imperial gallons and Great Britain, 6,682 imperial gallons.

Table 232.—Production of Crude Petroleum in Canada, by Provinces, 1928-1937

(Barrel=35 Imp. gal.)

Year	New Brunswick		Ontario		Alberta		Northwest Territories		Canada	
	Barrels	Value \$	Barrels	Value \$	Barrels	Value \$	Barrels	Value \$	Barrels	Value \$
1928.....	8,043	21,391	134,094	249,737	482,047	1,764,172			624,184	2,035,300
1929.....	7,499	19,909	121,194	253,678	988,675	3,458,177			1,117,368	3,731,764
1930.....	6,758	17,378	117,302	235,746	1,398,160	4,780,696			1,522,220	5,033,820
1931.....	6,577	15,461	122,365	219,993	1,413,631	3,976,220			1,542,573	4,211,674
1932.....	6,408	14,332	130,343	247,468	906,751	2,751,541	910	9,251	1,044,412	3,022,592
1933.....	8,835	18,111	136,058	253,486	995,832	2,844,157	4,608	23,037	1,145,333	3,138,791
1934.....	11,106	22,277	141,385	299,874	1,253,966	3,104,823	4,438	22,188	1,410,895	3,449,162
1935.....	12,954	18,230	165,041	346,156	1,263,510	3,102,227	5,115	25,575	1,446,620	3,492,188
1936.....	17,112	24,075	165,495	350,767	1,312,368	3,019,930	5,399	26,995	1,500,374	3,421,767
1937.....	18,089	25,496	165,205	356,000	2,749,085	4,961,002	11,371	56,855	2,943,750	5,399,353

Table 233.—Production of Crude Petroleum in Canada, by Months, 1937

(Barrel=35 imperial gallons)

Months	*New Brunswick	Ontario	*Alberta	*Northwest Territories	Canada
January.....	26	13,132	127,977		141,135
February.....	44	13,405	140,515	61	154,025
March.....	42	14,847	161,832		176,721
April.....	2,623	12,838	172,608		185,069
May.....	2,276	14,635	175,997	28	192,936
June.....	1,916	15,699	191,634	478	209,727
July.....	2,541	13,302	226,000	3,088	244,931
August.....	3,179	13,968	271,898	2,596	291,641
September.....	3,862	13,847	281,154	5,120	303,983
October.....	3,653	13,181	325,723		342,557
November.....	1,219	13,731	326,677		341,627
December.....	1,168	12,620	394,893		405,681
Total.....	22,549	165,205	2,796,908	11,371	2,996,033

*These figures represent the total output each month.

Table 234.—Production of Crude Petroleum in Canada, 1936 and 1937

Provinces	1936		1937	
	Barrels	Total Value \$	Barrels	Total Value \$
NEW BRUNSWICK.....	17,112	24,075	18,089	25,496
ONTARIO—				
Petrolia and Enniskillen.....	59,092	124,088	57,960	123,531
Oil Springs.....	31,795	69,947	33,853	75,580
Moore Township.....	3,200	6,720	2,253	4,805
Sarnia Township.....	584	1,226	445	949
Plympton Township.....	248	521	237	505
Bothwell Township.....	36,534	76,719	40,425	86,229
West Dover.....	15,536	32,625	10,498	22,388
Onondaga.....	262	609	728	1,908
Mosa Township.....	8,182	17,182	8,686	18,524
Brooke.....			773	1,649
Dunwich.....	307	645	303	646
Raleigh and Tilbury East.....	1,126	2,364	2,471	5,270
Thamesville.....	458	962	683	1,457
Dawn and Euphemia.....	8,171	17,159	5,890	12,559
Total for Ontario.....	165,495	350,767	165,205	356,000
ALBERTA—				
Turner Valley.....	1,281,248	2,989,447	2,721,218	4,932,051
Red Coulee-Border-Kebo (light crude).....	16,185	19,143	13,782	16,008
Wainwright-Skiff (heavy crude).....	14,935	11,340	14,085	12,943
Total for Alberta.....	1,312,368	3,019,930	2,749,085	4,961,002
NORTHWEST TERRITORIES.....	5,399	26,995	11,371	56,855
Canada.....	1,500,374	3,421,767	2,943,750	5,399,353

Table 235.—Petroleum Wells in Canada, by Provinces, 1935-1937

		New Brunswick	Ontario	Alberta	Canada
Productive wells at beginning of year.....	1935	23	2,066	122 (a)	2,213
	1936	23	2,109	122 (a)	2,256
	1937	23	2,079	129 (a)	2,233
Number of productive wells drilled.....	1935		12	5	17
	1936		21	10	31
	1937	1	38	28	67
Number of wells abandoned.....	1935		32	1	33
	1936		253	1	254
	1937	1	68		69
Number of dry wells drilled.....	1935		47	2	49
	1936		20	3	23
	1937		28	6	34
Number of productive wells in operation at end of year.....	1935	23	2,109	122 (a)	2,256
	1936	23	2,079	129 (a)	2,233
	1937	23	2,082	157 (a)	2,264

(a) Includes 2 wells in the Northwest Territories.

Table 236.—Imports into Canada of Petroleum, Asphalt and Their Products
1936 and 1937

	1936		1937	
	Quantity	Value	Quantity	Value
Oil, imported by miners or mining companies or concerns, for use in the concentration of ores of metals in their own concentrating establishments..... imp. gal..	105,052	\$ 83,470	66,545	24,116
Crude petroleum, gas oils, other than naphtha, benzine and gasoline lighter than -8235 but not less than -775 specific gravity at 60° temperature (To April 30, 1936)..... imp. gal.	10,366	682		
Crude petroleum in its natural state, -7900 specific gravity or heavier at 60° temperature, when imported by oil refiners to be refined in their own factories (To April 30, 1936)..... imp. gal.	220,312,360	6,881,369		
Crude petroleum not subjected to any other process than natural weathering and removal of foreign matter and water when imported by oil refiners to be refined in their own factories, -8155 specific gravity (42-0° A.P.I.) or heavier at 60° Fahrenheit (From May 1, 1936)..... imp. gal.	1,021,840,007	32,159,052	1,354,072,089	46,286,372
Crude petroleum not subjected to any other process than natural weathering and removal of foreign matter and water, when imported by oil refiners to be refined in their own factories, lighter than -8155 specific gravity (42-0° A.P.I.) at 60° Fahrenheit (From May 1, 1936)..... imp. gal.	9,341,344	418,526	7,276,223	363,266
Petroleum tops; blends of petroleum tops or petroleum products with crude petroleum; all the foregoing -7249 specific gravity (63-7° A.P.I.) or heavier at 60° Fahrenheit when imported by oil refiners to be refined..... imp. gal.	69,202	3,864	270	36
Petroleum (not including crude petroleum imported to be refined or illuminating or lubricating oils) -8235 specific gravity or heavier at 60° temperature (fuel oil) (To April 30, 1936)..... imp. gal.	4,954,374	187,056		
Crude petroleum, n.o.p. (From May 1, 1936)..... imp. gal.	2,661,344	78,294	666,901	27,979
Fuel oil, ex-warehoused for ships' stores..... imp. gal.	24,048,703	692,951	24,369,010	750,118
Illuminating oils composed wholly or in part of the products of petroleum, coal, shale or lignite, costing more than thirty cents per gallon (To April 30, 1936)..... imp. gal.	970	372		
Coal oil and kerosene lighter than -8236 specific gravity at 60° temperature..... imp. gal.	1,360,721	116,057	2,415,350	181,742
Engine distillate -8017 specific gravity or heavier at 60° temperature..... imp. gal.	1,220,037	93,158	1,451,292	105,832
Gasoline lighter than -8236 specific gravity at 60° temperature..... imp. gal.	19,077,873	1,643,152	25,725,505	2,301,672
Natural casinghead, compression or absorption gasoline, lighter than -6690 specific gravity (80-0° A.P.I.) at 60° Fahrenheit, when imported by refiners of crude petroleum for blending with gasoline wholly produced in Canada..... imp. gal.	41,909,389	2,594,533	46,752,596	3,086,462
lubricating oils, composed wholly or in part of petroleum, and costing less than 25 cents per gallon..... imp. gal.	11,049,911	1,738,131	10,630,033	1,666,625
Lubricating oils, n.o.p..... imp. gal.	3,247,038	1,208,579	4,701,097	1,746,106
All other oils, n.o.p..... imp. gal.	338,791	84,265	150,865	68,422
Products of petroleum, n.o.p., -8236 specific gravity (40-3° A.P.I.) or heavier at 60° Fahrenheit (From May 1, 1936)..... imp. gal.	16,089,423	602,123	24,946,467	939,719
Grease, axle..... lb.	4,950,846	262,226	5,858,947	342,386
Vaseline and all similar preparations of petroleum, for toilet, medicinal or other purposes..... \$		303,149		254,251
Paraffine wax..... lb.	4,291,834	184,450	6,394,336	279,822
Paraffine wax candles..... lb.	195,458	33,873	270,349	37,290
Naphtha and products of petroleum, n.o.p., lighter than -8235 specific gravity at 60° temperature (To April 30, 1936)..... imp. gal.	603,004	56,088		
Products of petroleum, n.o.p., lighter than -8236 specific gravity at 60° temperature (From May 1, 1936)..... imp. gal.	1,532,122	143,520	3,778,791	352,070
Liquefied petroleum gases for heating, cooking or illuminating purposes when imported in containers (From May 1, 1936)..... \$		4,953		9,852
Asphaltum or asphalt, solid..... cwt.	125,048	145,527		
Asphalt, not solid..... imp. gal.	37,810	4,518	166,732	184,175
Asphaltum oil for paving purposes only..... imp. gal.	42,497	3,250	67,837	4,099
Coke, petroleum..... tons	88,241	667,116	119,291	849,530
Total Petroleum, Asphalt and Their Products..... \$		50,394,304		59,861,942

Table 237.—Exports of Petroleum and Its Products, 1936 and 1937

	1936		1937	
	Quantity	Value	Quantity	Value
		\$		\$
Oil, petroleum, crude.....imp. gal.	216	9		
Oil, coal and kerosene, refined.....imp. gal.	631,681	93,267	890,309	93,039
Oil, gasoline and naphtha.....imp. gal.	3,378,983	509,150	4,300,115	400,800
Fuel oil.....imp. gal.	19,412,825	654,928	11,048,568	474,628
Oil, mineral, n.o.p.....imp. gal.	614,332	181,777	1,174,183	319,280
Wax, mineral.....cwt.	375	1,830	2,249	7,710
Coke, petroleum.....tons	14,548	250,195	16,967	235,990
Total—Petroleum and Its Products.....\$		1,691,156		1,531,447
RE-EXPORTS				
Gasoline.....imp. gal.	20,797	2,781	22,857	4,506
Fuel oil.....imp. gal.			2,167	269
Oil, mineral, n.o.p.....imp. gal.	4,146	2,048	13,389	12,515
Wax, mineral.....cwt.	585	1,306	21	297
Petroleum coke.....tons	21,115	328,386	32,990	559,678
Total—Re-Exports.....\$		334,521		577,265

Table 238.—Capital Employed in the Petroleum Industry in Canada, by Provinces,* 1936 and 1937

	1936			1937		
	Ontario	Alberta	Canada†	Ontario	Alberta	Canada†
	\$	\$	\$	\$	\$	\$
CAPITAL EMPLOYED AS REPRESENTED BY—						
Cost of lands, buildings, plant, machinery and tools.....	916,783	25,274,499	26,231,490	910,885	34,253,949	35,221,074
Cost of supplies and stocks on hand.....	15,349	681,749	712,070	7,061	937,436	965,857
Cash, trading and operating accounts and bills receivable.....	16,228	6,274,354	6,346,316	17,972	5,864,130	5,960,590
Total.....	948,360	32,230,602	33,289,876	935,918	41,055,515	42,147,521

* Data for New Brunswick included in the "Natural Gas Industry."

† Includes data for the Northwest Territories.

Table 239.—Employees, Salaries and Wages in the Petroleum Industry in Canada, by Provinces,† 1936 and 1937

Province	* Average number of employees				Salaries and wages		
	Salaried employees		Wage-earners	Total	Salaries	Wages	Total
	Male	Female					
1936					\$	\$	\$
Ontario.....	13	2	199	214	15,990	108,103	124,093
Alberta†.....	119	31	688	838	247,323	927,176	1,174,499
Canada.....	132	33	887	1,052	263,313	1,035,279	1,298,592
1937							
Ontario.....	13	3	193	209	20,085	122,300	142,385
Alberta†.....	163	38	1,210	1,411	336,808	1,861,166	2,197,974
Canada.....	176	41	1,403	1,620	356,893	1,983,466	2,340,359

* See footnote on page 41.

† Data for New Brunswick included in the "Natural Gas Industry."

‡ Data for the Northwest Territories included with Alberta.

Table 240.—Casing Used in the Petroleum Industry in Canada, 1936 and 1937

Size	1936		1937		Size	1936		1937	
	Weight	Length	Weight	Length		Weight	Length	Weight	Length
Inches	Pounds	Feet	Pounds	Feet	Inches	Pounds	Feet	Pounds	Feet
2.....			16,110	3,222	9½.....			918,620	21,803
2½.....			49,000	7,000	10.....	198,270	3,650	521,721	11,596
3.....	11,681	1,536			10½.....	473,249	9,669	2,100,765	46,770
3½.....			80,750	4,250	11.....	32,427	595		
3¾.....			67,332	7,239	12.....	33,507	620	99,495	2,211
4.....	29,685	4,336			13.....			552,050	11,041
4½.....			3,636	600	13½.....	473,094	8,761	1,788,459	27,278
4¾.....	4,240	265	70,880	4,430	14.....			151,794	2,811
5.....			3,681	433	15.....	55,125	735	65,925	879
5½.....			52,700	3,100	16.....	194,550	2,594	1,000,250	13,372
6.....	351,016	13,260	702,932	27,788	16½.....			112,350	1,498
6½.....	68,306	4,018			18.....	26,970	310		
6¾.....	714	42			18½.....			124,445	1,565
7.....	1,565,718	56,861	5,251,976	191,394	20.....	7,380	82	114,015	1,262
7½.....			199,120	8,830	21.....			4,326	42
8.....	143,976	3,999	220,892	6,142	21½.....	15,347	149	114,742	1,243
8½.....	3,456	144	456	19	24.....			30,030	273
9.....	1,114,660	30,816	807,620	23,932	24½.....			9,040	80
Total.....					Total.....				

2. The Petroleum Products Industry in Canada.

Forty-four petroleum refineries were in operation in Canada during 1937. These plants were located as follows—17 in Saskatchewan, 8 in Alberta, 5 in Ontario, 5 in Quebec, 3 in Manitoba, 3 in British Columbia and 1 in each of Nova Scotia, New Brunswick and the Northwest Territories. The operating refineries had a combined capacity of 168,220 barrels of crude oil per day (24 hours) made up as follows—Quebec, 40·7 per cent; Ontario, 24·1 per cent; British Columbia, 11·6 per cent; Saskatchewan, 9·6 per cent; Nova Scotia, 6·6 per cent; Alberta, 5·8 per cent; Manitoba, 1·5 per cent and New Brunswick and the Northwest Territories, the remainder. Fifteen plants had cracking units with a total capacity of 80,450 barrels a day.

The firms operating in the Petroleum Refining Industry in Canada during 1937 reported capital employed at \$63,759,579. The average number of employees working during the year was 5,047 and payments to these workers in the form of salaries and wages were \$8,126,583. Materials used in refining operations cost \$79,993,972, fuel and electricity cost \$4,444,878, while the value of products made was \$97,701,954.

In 1937 crude oil used consisted of 1,343,577,025 imperial gallons of imported crude oil and 90,004,669 imperial gallons of crude oil, naphtha and absorption gasoline from Canadian wells. The United States supplied 69·4 per cent of the imported crude oil. Stocks of crude and naphtha held at refineries at the end of the year totalled 133,033,933 imperial gallons.

Gasoline production in Canada in 1937 was the highest on record, amounting to 640,299,876 imperial gallons worth \$58,568,348. In addition, the refineries used for blending purposes, 47,514,563 imperial gallons of imported casinghead gasoline. Stocks held at the refineries on December 31st included 88,948,091 imperial gallons of straight run and cracked gasoline and 7,030,185 imperial gallons of imported casinghead, the latter for blending purposes only.

Fuel and gas oils produced (excluding any made and used for cracking purposes) totalled 544,109,039 imperial gallons, of which 489,185,282 imperial gallons were for sale and 54,923,757 imperial gallons for use as fuel in refineries. Imports amounted to 49,315,477 imperial gallons and exports, 11,050,735 imperial gallons. Refinery stocks at the end of 1937 aggregated 85,076,516 imperial gallons or 18,566,691 imperial gallons less than at the beginning of the year.

Thirteen firms were engaged in 1937 primarily in the compounding of lubricating oils and greases. These firms produced finished products worth \$752,060 compared with \$629,382 in 1936. Capital employed in this industry during the year totalled \$520,687 and employment was furnished 90 persons who received salaries and wages aggregating \$120,260.

Table 242.—Materials Used and Products Made by the Oil Refineries of Canada, 1936 and 1937

	1936		1937	
	Quantity	Value	Quantity	Value
MATERIALS USED—		\$		\$
<i>Petroleum refining—</i>				
Crude oil (under 60° A.P.I.) in its natural state from Canadian wells (run to stills)..... imp. gal.			65,719,569	3,792,682
Crude naphtha (60° A.P.I. and over) in its natural state, from Canadian wells..... imp. gal.	42,792,311	3,219,007	6,026,194	467,393
Absorption gasoline, etc., from Canadian wells (run to stills)..... imp. gal.			18,258,906	1,340,076
Crude oil in its natural state (run to stills)—				
(a) From the United States..... imp. gal.	906,642,075	46,026,181	994,420,631	53,060,003
(b) From other countries..... imp. gal.	337,028,509	13,340,638	349,135,949	16,674,628
Crude oil, not in its natural state (run to stills)—				
(a) From the United States..... imp. gal.			20,445	818
(b) From other countries..... imp. gal.				
Benzol for blending..... lb.	359,748	54,045	1,949,894	310,461
Sulphuric acid (66° Bé)..... lb.	22,809,518	213,433	23,086,547	204,255
Sulphur..... lb.	151,338	4,631	190,956	6,776
Caustic soda..... lb.	3,705,041	107,634	5,770,872	131,928
Soda ash..... lb.	290,677	6,350	347,273	7,289
Litharge..... lb.	349,315	24,644	474,545	40,747
Pullers' earth and clay..... lb.	18,907,295	243,164	18,843,458	240,309
Compounding materials.....		479,767		652,084
Tetraethyl fluid.....		1,580,695		2,136,547
Other materials.....		257,249		254,289
Shipping containers.....		661,660		673,687
Total.....		66,219,148		79,993,972
<i>Lubricating oils and greases—Total.....</i>		<i>336,737</i>		<i>407,908</i>
Grand Total.....		66,555,885		80,401,880

Table 242.—Materials Used and Products Made by the Oil Refineries of Canada, 1936 and 1937—Concluded

	1936		1937	
	Quantity	Value	Quantity	Value
		\$		\$
PRODUCTS MADE—				
<i>Petroleum refining—</i>				
Made for sale—				
Gasoline (a) straight run*..... imp. gal.	316,046,838	28,768,074	361,722,399	33,473,233
(b) by cracking process..... imp. gal.	251,436,449	21,800,125	278,362,079	25,073,645
Stove oil (40°-42-5° A.P.I.)..... imp. gal.			18,014,276	826,880
Gas and light fuel oil (20°-40° A.P.I., except diesel)..... imp. gal.	443,747,191	16,708,163	100,585,222	4,754,065
Diesel fuel oil (all fuel oil sold under this name)..... imp. gal.			41,503,283	1,808,621
Residual fuel oil (10°-20° A.P.I.)..... imp. gal.			329,082,501	11,953,010
Tractor and engine distillate..... imp. gal.	33,280,176	2,963,582	30,319,024	2,915,840
V.M. & P. or solvent naphtha..... imp. gal.	8,959,588	692,553	11,326,568	980,207
Kerosene..... imp. gal.	28,913,144	2,606,158	26,308,522	2,395,293
Lubricating oils..... imp. gal.	19,665,009	3,754,454	22,875,067	3,996,812
Grease..... lb.	11,399,546	527,979	13,899,436	511,426
Asphalt..... imp. gal.	34,860,569	3,031,466	56,811,878	4,336,778
Petroleum coke..... tons	62,077	381,473	59,634	371,198
Wax and candles..... lb.	11,347,044	413,884		479,038
Other products.....		11,195		
Total for sale.....		81,659,106		93,876,046
Made for own use—				
Gasoline (a) straight run..... imp. gal.	160,738	16,960	177,998	17,643
(b) by cracking process..... imp. gal.	15,251	1,821	37,400	3,827
Gas and light fuel (20°-40° A.P.I.)..... imp. gal.	54,570,427	1,995,397	239,631	11,835
Residual fuel oil (10°-20° A.P.I.)..... imp. gal.			54,684,126	2,100,864
V.M. & P. or solvent naphtha..... imp. gal.	1,608	202		
Kerosene..... imp. gal.	73,472	5,438	41,127	3,275
Lubricating oils..... imp. gal.	53,308	12,115	77,735	13,719
Tar..... lb.	304,045	12,162	1,381,825	55,265
Grease..... lb.	10,136	440	17,234	650
Asphalt..... imp. gal.	25,084	2,201	50,305	3,960
Petroleum coke..... tons	2,629	11,687	2,381	8,942
Still gas..... M cu. ft.	6,083,549	1,268,556	6,199,110	1,442,749
Wax and candles..... lb.	47	3		163,179
Other products.....		186,893		
Total for own use.....		3,513,875		3,825,908
Total Petroleum refining.....		85,172,981		97,701,954
Fuel and gas oils made and used in pressure cracking process. imp. gal.	†383,325,710		535,969,764	
<i>Lubricating oils and greases—</i>				
Lubricating oils..... imp. gal.	721,001	453,246	914,727	568,651
Lubricating greases..... lb.	845,800	115,262	902,251	131,766
Soaps and soap powders..... lb.		30,437		37,505
Other products.....		30,437		14,138
Total lubricating oils and greases.....		629,382		752,060
Grand total.....		85,802,363		98,454,014

* Includes Turner Valley naphtha and natural gasoline run to refinery stills but does not include the imported casing-head gasoline which was used for blending at the refineries.

† Not including 1,568,388 gallons of heavy naphtha.

CHAPTER EIGHT

THE NON-METAL MINING INDUSTRIES IN CANADA. (Other than Fuels)

Including detailed data relating to operations in the following industries:—

Asbestos	Miscellaneous—	Magnesitic dolomite
Feldspar, Nepheline,	Barytes	Magnesium sulphate
Syenite and Quartz	Bituminous sands	Mineral waters (natural)
Gypsum	Diatomite	Phosphate
Iron oxides (ochre)	Fluorspar	Pyrates (sulphur)
Mica	Garnet	Silica brick
Salt	Graphite	Sodium carbonate
Talc and soapstone	Grindstones, etc.	Sodium sulphate
	Lithium minerals	Strontium minerals

THE ASBESTOS MINING INDUSTRY, AND THE ASBESTOS PRODUCTS INDUSTRY

A—The Asbestos Mining Industry

Canadian asbestos production during 1937 totalled 410,026 short tons valued at \$14,505,791 compared with 301,287 short tons and \$9,958,183 in the preceding year. The output of the mineral in 1937 was the greatest ever recorded in the history of the Canadian asbestos mining industry and, as in former years, came almost entirely from the Eastern Townships in the Province of Quebec. An interesting feature of the industry in 1937 was the recording of a relatively small production of asbestos in Northern Ontario; this was the first commercial output of the mineral to be credited to this province in several years.

World production of asbestos has realized a continuous increase from 203,000 metric tons in 1932 to 503,000 metric tons in 1936, the most recent year for which complete data are made available by the League of Nations. As an asbestos producer Canada retains a premier world position, the output of the three principal producing countries in 1936 being—Canada, 273,300 metric tons; Russia, 125,100 metric tons, and Southern Rhodesia, 51,100 metric tons.

The average value for all grades of asbestos shipped from Canadian mines in 1937 was \$35.38 per ton compared with \$33.05 in 1936. The average value for fibres increased from \$48.65 per ton in 1936 to \$51.11 in 1937; the average value of shorts at \$16.13 was practically the same as in 1936 while the average value per ton of the relatively small tonnage of crudes sold declined from \$299.93 in 1936 to \$246.47 in 1937.

Exports of asbestos, including manufactures thereof, from Canada in 1937 were valued at \$14,545,370, or an increase of 43.53 per cent over 1936; of the 1937 shipments those consigned to the United States were appraised at \$8,262,550 and those to the United Kingdom at \$1,183,740, lesser quantities going to Australia, Belgium, France, Germany, and various other countries.

The number of Canadian asbestos mining companies reported as active in 1937 totalled 10; capital employed in the industry amounted to \$21,249,676; employees numbered 3,842 against 2,647 in 1936, and salaries and wages distributed aggregated \$4,232,507 compared with \$2,642,924 in the preceding year.

The Bureau of Mines of the province of Quebec reported that asbestos mining in 1937 had not only recovered its past activity but had a year of unprecedented prosperity. This is very gratifying, particularly in that the Quebec asbestos industry is now in its sixtieth year of production, the first shipment of the mineral from Thetford Mines having been made in 1878 from a mine which is still prominent and in full production. All asbestos mines in Quebec were particularly active during the whole of 1937. The general trend of asbestos mining, in the Thetford-Black Lake region, is to replace the open cast and cable derrick methods by underground mining, the hoisting of the rock being done through vertical shafts equipped with electric hoists. This is a consequence of the success achieved by the Asbestos Corporation in the introduction of the "block caving" method of mining at the King mine, inaugurated in 1932.

In Bannockburn township of the Matachewan district in Northern Ontario the construction of an asbestos mill was commenced by the Rahn Lake Mines Corporation, Ltd. The property of this company was active throughout the year and a small shipment of crude asbestos was reported.

Canadian asbestos as produced commercially in Quebec is of the chrysotile or serpentine variety and is of a high quality. Reserves of milling grade asbestos rock have been reported as sufficient for many years of commercial fibre production.

A review of the industry in 1937 by "Asbestos", Philadelphia, contains the following information—"New products placed on the market during the year included various types of asbestos cement shingles and sidings, noteworthy among which are the white siding shingles and clapboards, an insulated sheathing roof deck of asbestos-cement construction and a new type of industrial siding; a new type of asbestos paper, remarkable for its strength and designed particularly for the wrapping of warm air pipes and air conditioning ducts."

A paper "Asbestos and Its Utilization" prepared by D. Wolochow, National Research Laboratories, Ottawa, contains the following information—"...preparation of asbestos fibre for the market consists in the separation of the fibre from the rock by mechanical means. These milling operations consist of crushing, drying, and further crushing of the rock, followed by screening and air separation. The value of the fibre depends largely on its length and the grading of the milled fibre is based on fibre length as measured by a screen test. The manufacture of automobile brake linings and clutch facings is the largest single outlet for asbestos textiles..."

"The market price of asbestos fibre depends on the grade and variety, however, it is not possible to make a true comparison of the price of apparently corresponding grades from different sources, because methods and standards differ in the several producing countries. The following figures show there is a very wide range between the best "crude" and the lowest grade "shorts". Rhodesian prices are for spinning grade fibres only—

Price Range—1937

Canada.....	\$550 to \$11 per ton
Rhodesia.....	\$210 to \$180 per ton
Russia.....	\$475 to \$55 per ton
Vermont.....	\$ 47.50 to \$11 per ton

"Considerable work has been done with a view to finding new uses for asbestos, especially for the lower grades and for the waste rock, which among other things, is a potential source of magnesium metal and magnesium salts. In addition, some fundamental studies are being carried on. Microscopic investigation has shown that asbestos fibre is very probably the finest fibre in existence, a property which, when better understood, may lead to valuable new applications of this material. Knowledge of the physical nature of fibre aggregates, and thereby of the effects of milling processes on asbestos, is being definitely increased and put on a sound basis by this investigation."

Table 243.—Sales and Shipments (*) of Canadian Asbestos, 1935-1937

	1935		1936		1937	
	Tons	\$	Tons	\$	Tons	\$
Crudes.....	2,278	539,558	3,440	790,971	3,846	(b) 947,917
Fibres.....	102,270	4,873,255	133,288	6,483,946	200,247	10,235,820
Short fibres and shorts.....	105,919	1,641,801	164,559	2,683,266	205,933	3,322,054
Total.....	210,467	7,054,614	301,287	9,958,183	410,026	14,505,791
Sand gravel, and stone (waste rock only) (a)	3,025	2,053	3,103	2,356	3,980	3,301

(*) All from the province of Quebec.

(a) This production is included under the sand and gravel industry.

(b) Includes 1 ton valued at \$250 produced in Ontario.

Table 244.—Asbestos Rock Mined and Milled, 1935-1937

	1935	1936	1937
	Tons	Tons	Tons
Quantity of rock mined.....	2,852,118	4,692,004	6,477,805
Quantity of rock milled.....	2,256,994	3,568,992	5,440,607

Table 245.—Sales and Shipments of Asbestos, 1926-1937

Year	Tons	\$	Year	Tons	\$
1926.....	279,403	10,099,423	1932.....	122,977	3,039,721
1927.....	274,778	10,621,013	1933.....	158,367	5,211,177
1928.....	273,033	11,238,360	1934.....	155,980	4,936,326
1929.....	306,055	13,172,581	1935.....	210,467	7,034,614
1930.....	242,114	8,390,163	1936.....	301,237	9,958,183
1931.....	164,296	4,812,886	1937.....	410,026	14,505,791

Table 246.—Consumption of Asbestos in Specified Canadian Industries, 1936 and 1937

Industry	1936		1937	
	Quantity	Cost at works	Quantity	Cost at works
Electrical Apparatus and Supplies—		\$		\$
Board.....	147,311	21,651	232,034	34,226
Yarn.....	87,693	26,626	119,140	37,323
Tape.....	14,922	10,829	.....	16,730
Boilers, Tanks and Engines.....		4,547	.....	3,914
Asbestos Products—				
Fibre.....	9,084,553	149,649	11,788,087	209,871
Other forms.....	399,224	79,368	507,144	105,947
Roofing paper.....	1,242	42,468	2,430	168,334
Cotton goods, n.e.s.....	24,739	1,260	10,252	539
Woollen goods, n.e.s.....	204,723	56,537	165,027	49,505

Table 247.—Imports into Canada and Exports of Asbestos, 1936 and 1937.

	1936		1937	
	Tons	\$	Tons	\$
IMPORTS				
Asbestos brake and clutch lining.....	.....	321,163	.....	365,033
Asbestos packing.....	84	60,978	76	65,903
Asbestos in any form other than crude, and all manufactures of, n.o.p.....	.....	506,646	.....	718,061
Total Imports.....	.....	888,787	.....	1,149,057
EXPORTS				
Asbestos—Total Exports.....	136,547	7,391,517	196,511	10,972,852
To—United Kingdom.....	6,817	405,712	14,093	919,350
United States.....	77,691	4,052,187	98,196	5,347,488
Australia.....	2,055	103,271	3,042	150,919
Belgium.....	8,058	455,828	15,743	926,061
France.....	6,968	473,406	9,376	614,979
Germany.....	12,811	987,125	17,699	1,361,571
Italy.....	136	11,444	2,683	205,627
Japan.....	21,200	856,167	33,934	1,344,561
Netherlands.....	148	5,634	522	20,741
Spain.....	201	11,182	.....	.....
Poland and Danzig.....	302	21,684	238	21,795
Sweden.....	.....	.....	768	46,547
Asbestos sand and waste—Total Exports.....	157,678	2,567,343	194,530	3,242,457
To—United Kingdom.....	4,566	84,711	6,357	119,605
United States.....	146,081	2,350,527	176,708	2,913,183
Belgium.....	1,606	27,364	3,009	52,722
France.....	967	18,747	857	16,757
Germany.....	3,547	71,365	5,205	95,718
Netherlands.....	110	2,233	451	8,118
Japan.....	181	3,496	1,017	21,457
Asbestos manufactures, including asbestos roofing—Total Exports.....	.....	175,038	.....	330,061
To—United Kingdom.....	.....	86,589	.....	144,785
United States.....	.....	935	.....	1,879
Newfoundland.....	.....	6,818	.....	16,069
Australia.....	.....	30,106	.....	90,995
Argentina.....	.....	6,536	.....	9,047
Brazil.....	.....	11,511	.....	18,613
Chile.....	.....	2,331	.....	1,424
Colombia.....	.....	2,372	.....	2,855
Mexico.....	.....	9,857	.....	8,252
Peru.....	.....	2,949	.....	2,869
Total Asbestos Exports.....	.....	10,133,898	.....	14,545,370
To—United Kingdom.....	.....	577,012	.....	1,183,740
United States.....	.....	6,403,649	.....	8,262,550

Table 248.—Capital Employed in the Asbestos Industry in Canada, 1937

	\$
Capital employed as represented by:—	
(a) Present cash value of the land (excluding minerals).....	9,058,338
(b) Present value of buildings, fixtures, machinery, tools and other equipment.....	6,676,268
(c) Inventory value of materials on hand, ore in process, fuel and miscellaneous supplies on hand.....	651,848
(d) Inventory value of finished products on hand.....	820,150
(e) Operating capital (cash, bills and accounts receivable, prepaid expenses, etc.).....	4,043,074
Total.....	21,249,676

Table 249.—Employees, Salaries and Wages in the Asbestos Industry in Canada, 1937

	Number			Salaries and wages
	Male	Female	Total	
Salaried employees.....	280	41	321	\$ 522,213
Wage-earners—				
Mine.....	2,043		2,043	3,710,294
Mill.....	1,478		1,478	
Total.....	3,521		3,521	3,710,294
Grand total.....	3,801	41	3,842	4,232,507

Table 250.—Wage-Earners Employed, by Months, in the Asbestos Mining Industry in Canada, 1934-1937

Month	1934	1935	1936	1937		
	Total	Total	Total	Mine		Mill
				Surface	Underground	
January.....	1,577	1,605	2,011	1,429	378	1,289
February.....	1,587	1,650	1,964	1,408	364	1,256
March.....	1,595	1,640	1,950	1,517	437	1,357
April.....	1,587	1,739	1,941	1,595	434	1,512
May.....	1,780	1,813	2,351	1,638	513	1,505
June.....	1,928	1,938	2,448	1,702	525	1,537
July.....	1,902	2,036	2,555	1,718	512	1,526
August.....	1,806	1,953	2,687	1,678	549	1,577
September.....	1,623	1,957	2,827	1,643	544	1,580
October.....	1,688	2,148	2,923	1,588	447	1,550
November.....	1,762	2,237	2,939	1,527	437	1,526
December.....	1,653	2,304	2,820	1,530	373	1,510

THE ASBESTOS PRODUCTS INDUSTRY, 1937

Production in the asbestos products industry during 1937 was valued at \$1,896,677, an increase of 47 per cent over the total of \$1,293,909 reported for the previous year. Among the principal products made from asbestos during the year under review, were—brake lining at \$580,487; boiler and pipe covering at \$212,341; packings at \$131,213; clutch facings at \$126,124; paper at \$85,437; gaskets at \$23,167; cloth at \$6,795, and other asbestos lines made by one or two firms such as dryer felt, shingles and yarn. Other products made by firms in this industry included rockwool, hydraulic brake hose and packings of rubber, duck and flax.

In 1937 there were 13 plants in this industry, 6 being located in Quebec, 6 in Ontario, and 1 in Nova Scotia. Capital employed amounted to \$2,003,659 and employment was afforded to a monthly average of 451 people who received \$464,882 in salaries and wages. These firms also expended \$812,639 for materials used in manufacturing processes and \$91,252 for fuel and electricity.

Table 251.—Products Manufactured in the Asbestos Products Industry, 1936 and 1937

Product	Unit of measure	1936		1937	
		Quantity	Cost at works	Quantity	Cost at works
			\$		\$
Asbestos brake linings—Moulded.....	ft.	1,603,835	252,417	2,263,300	391,919
Asbestos brake linings—Other.....	ft.	954,357	139,892	1,449,744	188,569
Asbestos boiler and pipe covering.....	ft.	1,757,708	162,216	2,028,782	212,341
Asbestos cloth.....	lb.	11,940	4,200	10,806	6,795
Asbestos clutch facings.....	No.		91,147	557,916	126,124
Asbestos gaskets.....	lb.	33,655	21,216	39,380	23,167
Asbestos packings of all kinds.....	lb.	257,780	113,821	433,083	131,213
Asbestos paper.....	lb.	1,844,768	78,796	2,413,150	85,437
All other products (x).....	\$		430,204		731,113
Total.....	\$		1,293,909		1,896,677

(x) Includes products made by 1 firm such as rockwool, asbestos dryer felt, hydraulic brake hose, asbestos shingles asbestos yarn, packings of rubber, duck and flax, etc.

Table 252.—Materials Used in the Manufacture of Asbestos Products, 1936 and 1937

Material	Unit of measure	1936		1937	
		Quantity	Cost at works	Quantity	Cost at works
			\$		\$
Asbestos fibre.....	lb.	9,084,553	149,649	11,788,087	209,871
Asbestos cloth.....	lb.	16,060	4,689	30,477	10,073
Asbestos paper, corrugated and plain.....	lb.	147,136	6,947	123,913	5,444
Asbestos sheets and strips.....	lb.	19,036	9,518	57,284	12,851
Asbestos yarn.....	lb.	216,992	58,214	295,470	77,579
Cotton cloth and yarn.....	\$		51,893		68,286
Rubber and rubber sheets.....	lb.	36,071	3,152	94,525	19,474
Containers and packing material.....	\$		69,842		81,566
All other materials.....	\$		268,626		327,495
Total.....	\$		622,530		812,639

Table 253.—World Production of Asbestos, 1935-1937

(Supplied by Imperial Institute)

(Long tons)

Producing Country and Description	1935	1936	1937	Producing Country and Description	1935	1936	1937
BRITISH EMPIRE				FOREIGN COUNTRIES			
Southern Rhodesia.....	38,034	50,309	50,905	Bulgaria.....	3		(a)
Union of South Africa—				Czechoslovakia.....	2,600	2,700	(a)
Amosite.....	4,031	5,323	5,808	Finland.....	3,400	7,000	7,500
Blue.....	2,097	2,955	4,686	France.....	450	400	200
Chrysotile.....	12,105	13,469	15,049	Greece.....	2	2	2
Anthophyllite.....		65	22	Italy.....	4,252	6,016	(a)
Canada—				U.S.S.R.....	93,975	123,141	(a)
Chrysotile (b).....	190,618	271,777	369,648	United States (sales)—			
Crude.....	2,034	3,071	3,434	Chrysotile.....	8,406	9,393	11,861
Fibre.....	91,313	119,007	178,792	Amphibole.....		361	546
Shorts.....	94,570	146,928	183,869	Argentina.....	13		(a)
Sand and gravel (waste rock only).....	2,701	2,771	3,553	Bolivia.....			21
Cyprus.....	7,493	9,202	11,173	Venezuela.....	75	70	(a)
India.....	63	57	100	French Indo-China.....		5	
Australia.....	176	239	165	Japan (estimated).....	1,000	1,000	1,000
				Korea.....	6	68	(a)
				Turkey.....	102	117	155
Total.....	255,000	353,000	458,000	Total.....	114,000	150,000	(a)
				World's Total.....	369,000	503,000	(a)

Asbestos is also produced in China.

(a) Information not available. (b) Sales and shipments.

FELDSPAR AND QUARTZ MINING INDUSTRY

Owing to the very close physical association of these minerals in many Canadian deposits (pegmatites), it has been found difficult for some operators to make a separation of all data pertaining to the mining of each individual mineral and, for this reason, the general statistics relating to capital, employment, fuel and electricity, etc., have been combined in this report. Since 1936 corresponding statistics relating to the production of nepheline-syenite have been included with those pertaining to the commercial production of feldspar and quartz.

During 1937 the gross value of production by the industry and including the value of feldspar, quartz and nepheline-syenite sold totalled \$1,428,714 compared with corresponding values of \$789,682 in 1936 and \$901,998 in 1929. In 1937 commercial shipments of feldspar were made only from properties located in Ontario and Quebec; quartz in various forms was produced in Nova Scotia, Quebec, Ontario and Saskatchewan while production of nepheline-syenite was confined to the province of Ontario.

The number of firms reported as active in the industry in 1937 totalled 39, capital employed was recorded at \$1,352,992, employees numbered 445, salaries and wages paid amounted to \$384,698 and the value of fuel, electricity and process supplies consumed totalled \$186,470. The net value of all products sold was estimated at \$1,242,244.

FELDSPAR

Commercial shipments of feldspar by Canadian producers totalled 21,346 short tons valued at \$178,222 in 1937 as against 17,846 tons worth \$154,475 in the preceding year. The tonnage shipped during the year under review was the greatest since 1930 and its value the highest since 1931. Canadian production of feldspar established an all time high record in 1924 when shipments totalled 44,804 short tons valued at \$358,540.

The initial development work in the Canadian feldspar industry was conducted on deposits located at Villeneuve, Templeton and Hull townships, in the province of Quebec. In Ontario work was commenced in 1900 on large feldspar deposits occurring in the townships of Bedford and Portland in the eastern part of the province. Later, deposits in the Hybla, Mattawa, Sudbury, Parry Sound and Bathurst districts in Ontario were developed and during recent years shipments of the mineral have been made from a property located in the Pointe du Bois district, Southeastern Manitoba. At present there are two Canadian mills engaged in the grinding of feldspar, one located at Buckingham, Quebec and the other at Kingston, Ontario. In 1937 the greater part of Ontario's output of feldspar came from a large property operated in Lanark county while in Quebec almost the entire output came from deposits contiguous to the Lièvre River, north of Buckingham.

The Bureau of Mines, Ottawa, reports that pegmatite dykes, the main source of commercial feldspar are distributed widely throughout the Precambrian rocks of Eastern and Northern Canada, and the potential reserves of the mineral are very great. Development possibilities, however, in view of the comparatively low unit value of the mineral, hinge upon the two important factors of run-of-mine freedom from iron-bearing impurities and cost of transportation to grinding plant. As indicating present consumption trends, an official survey of the feldspar industry in the United States showed that sales by percentages of ground feldspar in 1937 were as follows: glass 50.9; pottery 36.6; enamel and sanitary ware 9.0; other ceramic uses 2.3 and soaps, abrasives, binders and various, 1.2 per cent.

Imports of crude feldspar into Canada during 1937 totalled 439 short tons valued at \$2,197 and those of ground feldspar, all from the United States amounted to 1,356 tons at \$22,937. Exports of feldspar and nepheline-syenite from Canada in the same year totalled 27,462 short tons worth \$197,000 and of these 27,335 tons at \$193,472 were consigned to points in the United States.

The "Chemical Age" states that Y. P. Varshney reports, in "Science and Culture", results of experiments made on the utilization of slags produced in iron and steel plants as a constituent in glass-making batches. He has shown that glass cheaply made with slag and feldspar can be easily used for manufacturing bottles, jars, floor tiles, roof tiles, etc., in various transparent colours as well as in opaque and black varieties. A batch of the following composition gave a most workable and fluid bubble-free bottle green glass at a temperature of 1,350°C.:—slag 100 parts, sand 150 parts, feldspar 150 parts, slacked lime 35 parts and soda ash 90 parts. The use of slag in these glasses reduces the cost by about 50 per cent.

TARIFF REVISIONS

Trade agreements between Canada and the United States and between the United Kingdom and the United States were signed at Washington on Thursday November 17, 1938. The following statement prepared by the United States Tariff Commission shows the former and new rates of duty on feldspar and nepheline-syenite in schedule II (United States concessions to Canada), and the total imports of such products into the United States and the imports from Canada according to preliminary United States statistics for the year 1937: Crude feldspar; duty under the tariff act of 1930, 50 cents per ton; under the 1935 agreement 35 cents per ton and under the new agreement 25 cents per ton; imports of crude feldspar, into the United States in 1937 were valued at \$91,885, all from Canada. Ground feldspar: duty under 1930 tariff and 1935 agreement 30 per cent; under new agreement 15 per cent. No imports of ground feldspar into the United States are recorded for 1937. Ground nepheline-syenite duties same as recorded for ground feldspar; data relating to imports in 1937 not available. Crude nepheline-syenite is placed on the free list but in the event imports of crude and ground nepheline-syenite together exceed 50,000 tons per annum, the two governments shall consult regarding action to be taken. If consultation results in no agreement, the United States Government shall be free to impose a duty.

Table 254.—Production of Feldspar in Canada, by Provinces, 1928-1937

Year	Quebec		Ontario		Manitoba		Canada	
	Tons	\$	Tons	\$	Tons	\$	Tons	\$
1928.....	12,943	104,789	18,954	180,153	.....	.....	31,897	284,942
1929.....	15,790	133,492	21,737	206,979	.....	.....	37,527	340,471
1930.....	17,074	163,802	9,722	104,667	.....	.....	26,796	268,469
1931.....	10,381	86,842	7,962	100,119	.....	.....	18,343	186,961
1932.....	3,390	39,062	3,657	42,920	.....	.....	7,047	81,982
1933.....	6,183	59,283	4,387	45,350	88	484	10,658	105,117
1934.....	9,207	78,853	7,302	61,665	1,793	6,763	18,302	147,281
1935.....	7,002	63,075	8,656	75,003	2,084	6,252	17,742	144,330
1936.....	8,115	75,703	8,409	70,840	1,322	7,932	17,846	154,475
1937.....	12,285	109,612	9,061	72,610	.....	.....	21,346	178,222

Table 255.—Imports and Exports of Feldspar, 1931-1937

	Imports*		Exports	
	Tons	\$	Tons	\$
1931.....	1,877	37,297	10,975	88,913
1932.....	1,487	24,875	2,017	15,465
1933.....	561	7,970	3,596	23,076
1934.....	1,039	15,245	10,532	65,158
1935.....	608	11,000	9,959	59,893
1936.....	741	14,240	114,133	94,537
1937.....	1,794	25,134	27,462	197,000

*Crude and ground.

†Includes nepheline-syenite since 1936.

Table 256.—Feldspar Consumed in Specified Canadian Industries 1936 and 1937

Industries	1936		1937	
	Tons	\$	Tons	\$
Abrasive products.....	36	999	53	1,506
Imported clay products.....	1,572	28,521	2,428	46,028
Soaps and cleaning preparations.....	939	10,221	1,119	13,329
Iron and steel products.....	369	6,503	441	7,385
Glass.....	3,929	67,741	3,074	52,501

Feldspar Prices (November, 1938).—UNITED STATES—Per ton, f.o.b. North Carolina, potash feldspar, 200 mesh, white, \$17 in bulk; soda feldspar, \$19 f.o.b. Main, potash feldspar, white, 200 mesh, \$17, in bulk. Granular glass spar, white, 200 mesh, f.o.b. North Carolina, \$12.50 in bulk; semi-granular, \$11.75; soda feldspar, 200 mesh, white, \$19. Virginia: No. 1, 230 mesh, \$18; 200 mesh, \$17; No. 17 glassmakers', \$11.75; No. 18, \$12.50. Enamellers, \$14 to \$16. Quotations on Spruce Pine, N.C., or Keene, N.H., basis. (Engineering and Mining Journal's "Metal and Mineral Markets"—New York).

Canadian prices remained at the level of 1936, with No. 1 ceramic grade quoted at \$5.50 f.o.b. rail or mill. Ground spar sold at \$16 per ton, ex mill.

Table 257.—World Production of Feldspar, 1935-1937

(Supplied by Imperial Institute)

(Long tons)

Producing Country	1935	1936	1937
BRITISH EMPIRE			
United Kingdom—			
China stone.....	57,160	66,509	60,715
Canada (sales).....	15,841	15,934	19,059
India.....	702	785	487
Australia (including china stone).....	4,711	3,691	3,806
FOREIGN COUNTRIES			
Czechoslovakia (estimated).....	30,000	30,000	30,000
Finland (exports).....	2,038	2,480	3,181
Germany (Bavaria only).....	5,860	7,864	9,828
Italy.....	7,496	8,484	(a)
Norway.....	16,697	24,792	23,859
Roumania (b).....	11,344	(a)	(a)
Sweden.....	47,869	55,902	48,364
U.S.S.R.....	23,844	(a)	(a)
Egypt.....	71	44	156
United States (sales).....	189,550	244,726	268,532
Argentina.....	487	1,065	(a)

Feldspar is also produced in China and "Manchoukuo."

(a) Information not available.

(b) Converted from cubic metres at the rate of 1 cubic metre=2 long tons.

NEPHELINE-SYENITE

Production of nepheline-syenite in Canada during 1937 was valued at \$121,481 compared with \$37,426 in the preceding year. The output in both years came from properties located in eastern Ontario.

The following information relating to nepheline-syenite is abstracted from report No. 791 issued by the Bureau of Mines, Ottawa:—"Nepheline-syenite is an igneous rock consisting of a mixture of the feldspathoid mineral nepheline (or nephelite), a silicate of alumina and soda, and varying amounts of soda and potash feldspars. It is used in the ceramic trade (at present mainly in the glass industry) as a substitute for straight feldspar.

"Interest in the material as an industrial mineral or rock is of recent date, the first production being in 1936, when Canadian Nepheline Ltd., opened a quarry at Blue Mountain in Methuen township, Peterborough county, about 27 miles northeast of Lakefield, and erected a mill at Lakefield to crush and process the rock for market. Processing of the quarry-run rock is necessary to remove the small amount of iron-bearing minerals present, principally magnetite. The material is of particular interest to the glass industry owing to its higher content of alumina (about 24 per cent) as compared with straight feldspar (about 20 per cent). Research indicates that the syenite may have useful application in other branches of ceramics, such as semi-vitreous ware and porcelain enamels. During 1937 operations of Canadian Nepheline Limited were further extended by the formation of a subsidiary, American Nepheline Corporation; during the year this company erected a large crushing and processing plant at Rochester, N.Y., for the treatment of the Canadian mined rock.

"In 1937 a second company, Gooderham-Nepheline commenced operations on a property in Glamorgan township, Haliburton county; from the Vardy property in Dungannon township, Hastings county, the Golding-Keene Company made shipments of the syenite to its mill at Keene, New Hampshire."

Table 258.—Production of Nepheline Syenite in Canada, 1936 and 1937

Year	Quantities		Value
	(a)	(b)	\$
1936.....	(a)	(b)	37,426
1937.....	(a)		121,481

† Produced in Ontario only.

(a) Quantity not published.

(b) First commercial production in Canada.

QUARTZ (SILICA)

The production of natural silica or quartz in Canada during 1937 totalled 1,377,448 short tons valued at \$1,129,011 compared with 1,046,649 tons at \$597,781 in 1936. Output of primary silica products by the Canadian Quartz Mining industry includes crude and crushed dyke quartz, quartzite, sandstone and natural silica sands and gravels. The mineral in one or more of the forms thus defined was produced during 1937 in Nova Scotia, Quebec, Ontario and Saskatchewan. Shipments of silica in Nova Scotia were made to steel plants largely for the making of silica brick. In Quebec high grade silica sands were produced for the manufacture of glass and chemicals, while a considerable tonnage of these same sands was sold for sandblasting and various other purposes; in the same province large quantities of crushed quartzite or sandstone were mined and milled for the manufacture of silicon carbide and ferrosilicon. The greater part of the tonnage of silica shipped in Ontario during 1937 represented material intended for use in the production of silica brick and ferrosilicon and for the fluxing of nickel-copper ores. Quartz production as recorded for Saskatchewan represented natural silica sands or gravels shipped as flux to the Flin Flon Smelter of the Hudson Bay Mining and Smelting Co. Ltd.

The price per ton of the several grades of silica varies greatly, depending on its purity and on the purpose for which it is to be used. Silica, on the whole, is a comparatively low-priced commodity, and therefore the location of a deposit with respect to markets is of great importance. According to a report issued by the Bureau of Mines, Ottawa, the larger markets for silica are in the provinces of Quebec and Ontario, and any new deposits being opened up should be within economic reach of either Montreal or Toronto.

Table 259.—Production in Canada and Imports of Quartz and Silica Products, 1936 and 1937.

	1936		1937	
	Short tons	Value	Short tons	Value
		\$		\$
PRODUCTION (*) (SHIPMENTS)—				
Nova Scotia.....	6,764	10,819	11,732	14,078
Quebec.....	78,975	320,634	127,535	448,327
Ontario.....	884,585	216,037	1,142,372	633,073
Manitoba.....	90	45		
Saskatchewan.....	76,089	49,458	95,809	33,533
British Columbia.....	146	788		
Canada.....	1,046,649	597,781	1,377,448	1,129,011
IMPORTS—				
Ganister.....	4,097	8,140	2,405	5,980
Flint and ground flint stones.....	1,234	23,079	1,811	38,616
Silex or crystallized quartz, ground or unground.....	4,056	84,393	4,276	103,940
Silica sand for glass, carborundum and steel and filtration plants and sand blasting (a).....	143,611	270,824	212,840	373,760
Silica firebrick, 90% silica.....		261,974		539,253

(*) Includes both crude and crushed quartz and quartzite, silica flux and natural silica sands. See footnote to following Table 260.

(a) 139,070 tons from the United States and 4,449 tons from Belgium in 1936 and 212,386 tons from the United States, 222 tons from Belgium and 232 tons from the United Kingdom in 1937.

NOTE.—No exports of silica from Canada are recorded as such and any possible exports of same may be included under stone or sand.

Table 260.—Production (*) (Use) of Natural Low Grade Silica Sand and Silica Gravel as Non-Ferrous Smelter Flux, 1936 and 1937

	1936		1937	
	Tons	\$	Tons	\$
Ontario.....	814,634	90,925	980,427	343,149
Saskatchewan.....	76,089	49,458	95,809	33,533
Total	890,723	140,383	1,076,236	376,682

(*) Included in totals shown in Table 259; also complete data for production of this material in Ontario during previous years are not available.

Table 261.—Production of Quartz (Silica) in Canada, 1928-1937

Year	Tons	\$	Year	Tons	\$
1928.....	282,522	523,933	1933.....	185,783	297,820
1929.....	265,949	561,527	1934.....	272,563	482,265
1930.....	226,200	418,127	1935.....	233,002	424,882
1931.....	195,724	303,158	1936*	1,046,649	597,781
1932.....	189,132	276,147	1937*	1,377,448	1,129,011

*See footnote to Table 259.

Prices.—UNITED STATES (November, 1938)—Silica, per ton, water ground and floated, in bags, f.o.b. Illinois: 325 mesh, \$21 to \$40 for 92 to 99½ per cent grades. Dry ground, air floated, 325 mesh, 92 to 99½ per cent silica, \$20 to \$30. Glass sand, f.o.b. producing plant, \$1.25 to \$5 per ton; molding sand, 50 cents to \$3.50; blast sand, \$1.75 to \$6. California: \$5 for quartz and \$2.50 for sand. Quartz rock crystals for fusing, all sizes, \$100 per ton; prisms for piezo-electrical and optical use command premium. (Engineering and Mining Journal's "Metal and Mineral Markets"—New York.)

"Canadian Chemistry and Metallurgy"—Toronto—quotations (October, 1938)—silica sand, various grades, car lots, ton \$8 to \$9. Silica quartz 99 per cent, 110-220 grade, car lots—to \$15 per ton. The price for the lower grades of crude quartz varies greatly according to purity and purpose of use.

Table 262.—Consumption of Quartz, Silica Sand, etc., in Canada, by Industries, According to Census of Industry Reports, 1936 and 1937

Industry	1936		1937	
	Quantity	Cost at works	Quantity	Cost at works
SILICA SAND AND SILICA (including ground quartz)—	Short tons	\$	Short tons	\$
Soaps and cleaning preparations.....	4,918	79,020	4,685	76,378
Acids and salts.....	11,715	60,279	11,659	54,769
Paints.....	739	28,522	836	21,306
Refractories.....	285	1,778	35	256
Roofing paper.....	1,993	10,072	1,976	11,657
Abrasives.....	44,455	217,499	45,240	211,899
Glass.....	68,176	331,844	82,267	382,728
Enamelling materials.....	434	3,366	493	3,971
Products from imported clays.....	2,305	26,722	3,032	44,648
Foundry facings and supplies.....	36	374	48	430
Non-ferrous smelters(*).....	890,723	140,383	1,076,236	376,682
Steel foundries.....	23,420	121,142	37,015	207,510
Total accounted for	1,049,199	1,021,001	1,263,522	1,392,234
QUARTZ AND QUARTZITE—				
Acids and salts.....	2,183	6,396	1,537	3,632
Ferro-alloys.....	15,777	45,661	35,633	80,201
Non-ferrous smelters.....	146	788		
Total accounted for	18,106	52,845	37,170	83,833

NOTE.—Consumption values are costs at works.

(*) The quantities reported under this industry represent low grade natural silicious sands used for fluxing purposes.

In addition to the quantities shown a relatively large quantity of quartz or quartzite is consumed in the manufacture of silica brick.

Table 263.—Principal Statistics of the Feldspar and Quartz Mining Industry, 1936 and 1937

	Ontario (x) (b)		Quebec	
	1936	1937	1936	1937
Number of firms (a).....	16	18	18	21
Capital employed..... \$	661,911	485,663	738,113	867,329
Number of employees—On salary.....	14	(d) 25	17	(c) 25
On wages.....	122	160	171	235
Total.....	136	185	188	260
Salaries and wages—Salaries..... \$	16,788	30,697	29,310	38,163
Wages..... \$	97,192	151,297	95,558	164,541
Total..... \$	113,980	181,994	124,868	202,704
Selling value of products (gross)..... \$	393,345	874,775	396,337	553,939
Cost of fuel and purchased electricity..... \$	21,159	29,092	35,785	53,519
Cost of process supplies..... \$	91,339	75,130	12,630	28,729
Net value of sales..... \$	280,847	770,553	347,922	471,691

(x) In 1936 includes 1 firm operating in Nova Scotia, Manitoba, Saskatchewan and British Columbia (a total of 4). In 1937 includes 1 firm in Nova Scotia and 1 in Saskatchewan. (a) Small shippers from whom reports were unobtainable and whose production is recorded from consumers returns are sometimes not included in the total. (b) Includes data relating to production of nepheline-syenite. (c) 4 female and 21 male. (d) 2 female and 23 male.

Table 264.—Capital Employed in the Feldspar and Quartz Mining Industry, in Canada, 1937

	Quebec†	Ontario
	\$	\$
CAPITAL EMPLOYED AS REPRESENTED BY—		
(a) Present cash value of the land (excluding minerals).....	192,799	80,474
(b) Present value of buildings, fixtures, machinery, tools and other equipment.....	518,516	293,259
(c) Inventory value of materials on hand, ore in process, fuel and miscellaneous supplies on hand.....	32,413	6,124
(d) Inventory value of finished products on hand.....	71,804	82,715
(e) Operating capital (cash, bills and accounts receivable, prepaid expenses, etc.).....	54,797	20,092
Total.....	870,329	482,663

†Includes 1 firm in Nova Scotia.

Table 265.—Number of Wage-Earners on Pay Roll in Feldspar and Quartz Mining Industry, by Months, 1937

Month	Number	Month	Number
January.....	278	July.....	461
February.....	282	August.....	455
March.....	289	September.....	490
April.....	338	October.....	484
May.....	345	November.....	474
June.....	416	December.....	367

THE GYPSUM INDUSTRY

(1) Primary Production—The Gypsum Mining and Quarrying Industry

Production of gypsum in Canada during 1937 totalled 1,047,187 short tons valued at \$1,540,483 as compared with 833,822 short tons at \$1,278,971 in 1936. The tonnage shipped or used in 1937 was the greatest since 1930 and its value was the largest recorded since 1931. Output in 1937 included 51,147 tons of lump or mine run; 902,217 tons of crushed; 916 tons of fine ground and 92,907 tons of calcine. The average value per ton of lump gypsum, including anhydrite, was \$1.30 in 1937; crushed grades averaged \$1.07 per ton; fine ground \$6.24 and calcined material \$5.45.

Increases in the value of shipments as compared with 1936 were realized in Nova Scotia, New Brunswick, Ontario, Manitoba and British Columbia, the five gypsum producing provinces; corresponding increases in the tonnage of gypsum sold were recorded for each of these provinces with the exception of New Brunswick, where producers reported a relatively small decrease in the quantity of the mineral sold or consumed. Nova Scotia is the greatest producer of gypsum in Canada with the output in 1937 totalling 926,796 tons or 88.5 per cent of the entire Canadian output.

In 1937 the number of firms reporting production was 9 and the gypsum quarries and mines in operation totalled 13. Some of the Canadian gypsum mining companies confine their operations in the Dominion to the production and shipment of crude gypsum or anhydrite, while others, in addition to marketing various grades of crude gypsum, produce a calcine for sale or for consumption in their own gypsum products plants.

Capital employed by gypsum producing firms, reported as active, totalled \$6,902,222 in 1937; employees aggregated 602; salaries and wages paid amounted to \$595,396 and the total value of fuel, purchased electricity and process supplies consumed was recorded at \$263,077.

A report (No. 791) issued by the Bureau of Mines, Ottawa, contains the following information relating to Canadian gypsum:—"The materials produced are the hydrous calcium sulphate, commonly known as gypsum, the partly dehydrated material known as plaster of Paris or wall plaster, and the anhydrous calcium sulphate known as anhydrite. Gypsum is marketed in the crude form, ground as 'land plaster' and 'terra alba', or ground and calcined as plaster of Paris and wall plaster. Each year an increasing proportion of the calcined material enters into the manufacture of wall board, gypsum blocks, insulating material, acoustic plaster, etc. Anhydrite is used mainly as a fertilizer for the peanut crop in the Atlantic Seaboard states of the southern United States. . . . The use of anhydrite in England for the manufacture of sulphuric acid, ammonium sulphate, and special plasters is rapidly increasing, and the shipment of 2,500 tons of anhydrite during the past year marks the entry of Canada into this market."

Gypsum is exported from Canada almost entirely in the crude form; during 1937 exports totalled 841,191 short tons valued at \$960,711 as compared with 650,377 tons and \$756,010 in 1936; of the 1937 exports, 735,125 short tons worth \$851,518 went to the United States and 103,602 short tons valued at \$106,443 to the United Kingdom.

GENERAL NOTES

United States.—The gypsum industry in 1937 reached the highest level since 1930. The apparent new supply of crude gypsum in the United States increased 566,150 short tons (17 per cent) over 1936. Nearly half of the increase resulted from a 33 per cent rise in crude gypsum imported; domestic crude production was 345,656 tons higher than in 1936, a gain of 13 per cent. In 1937 crude gypsum was mined in 17 states at 58 active operations, including 29 underground mines, 24 quarries and 5 combination mines and quarries. The average value per ton in 1937 for United States crude was \$1.56. Chemical manufacturers in the United States annually produce large quantities of precipitated gypsum which constitute a major waste disposal problem at some plants. Most of this gypsum is produced in the manufacture of phosphoric acid and phosphate chemicals. In 1937 gypsum products derived from by-product gypsum were sold by two companies on the Atlantic Coast, one in the Middle West and one on the Pacific Coast. . . . Results of investigations by the United States Bureau of Mines on anhydrite as Portland cement retarder show that anhydrite-gypsum mixtures containing up to 50 per cent anhydrite may be as effective as pure gypsum depending on the total amount of S.O.₃ added and the susceptibility of the cement clinker to retardation. (United States Bureau of Mines).

South Australia.—The distribution of gypsum through the state is very wide and only the most favourably situated of the known deposits have been worked. Crystalline gypsum suitable for the manufacture of plaster and for use in the production of cement has long been obtained from the extremity of Yorke Peninsula, and more recently from Lake MacDonnell to the South of Penong. Plaster is manufactured at Port Adelaide. The granular and pulverable types (known as "seed" and "flour" gypsum respectively) have been worked to provide material for agricultural use. Crystalline gypsum has been shipped in large quantities to New Caledonia for use in the smelting of nickel ores. The largest output of gypsum in a single year has been that recorded for 1936, when 107,151 tons were raised. (Director of Mines, South Australia).

Union of South Africa.—The greater portion of the high grade gypsum produced is utilized in the local cement factories. Recently, however, increased interest has been taken in the manufacture of gypsum products used in the building trade, and a factory has been erected on the Rand which will provide a greater outlet for the lower grades of gypsum. Production of gypsum during 1937 totalled 36,582 short tons valued at £30,780 as compared with 35,232 short tons at £28,161 in 1936. (Union of South Africa Department of Mines.)

France.—"The difficulty in France in obtaining adequate quantities of pyrites for its chemical industry has led to an interesting development....In view of these circumstances and the difficulty of obtaining supplies in war for the manufacture of sulphuric acid, the gypsum occurrences of Lorraine, the Alps and the Paris Basin are being utilized as a source of the sulphur for sulphuric acid manufacture. Gypsum mixed with a highly silicious sand, and fused in an electric furnace, yields sulphur dioxide and a calcium silicate product, which is said to be a good quality cement....." (Deutsche Bergwerks Teit.)

The principal gypsum deposits in France are located along the Marne and Seine rivers and range from 4 to 30 metres in thickness. In Western France the industry is centred about Charente. It is stated that French production is about twice the domestic consumption. Crude gypsum is exported to neighbouring countries and special plasters are exported.

United Kingdom.—About one-third of the output of gypsum in the United Kingdom comes from the Durham district followed by the Nottingham, Stafford and smaller producing districts of Westmoreland and Cumberland. Production during 1936 totalled 1,002,472 long tons as compared with 961,581 long tons in 1934. Imports (less exports) of crude gypsum, including alabaster, amounted to 177,758 long tons in 1936 as against 106,452 long tons in 1934; imports of calcined gypsum totalled 23,917 long tons in 1936.

Table 266.—Production in Canada, Imports and Exports of Gypsum, 1936 and 1937

	1936		1937	
	Quantity	Value	Quantity	Value
	Tons	\$	Tons	\$
SHIPMENTS BY GRADES—				
Crude (1)—Lump or mine run.....	47,628	58,954	51,147	66,237
Crushed.....	709,326	794,002	902,217	961,776
Fine ground.....	738	4,108	916	5,716
Calcined gypsum (2).....	76,130	421,907	92,907	506,754
Total.....	833,822	1,278,971	1,047,187	1,540,483
SHIPMENTS BY PROVINCES—				
Nova Scotia.....	729,019	808,294	926,796	978,288
New Brunswick.....	38,470	123,560	36,906	131,727
Ontario.....	40,191	182,783	53,780	233,895
Manitoba.....	12,064	87,076	13,941	88,095
British Columbia.....	14,078	77,258	15,764	108,478
Total.....	833,822	1,278,971	1,047,187	1,540,483
Total gypsum mined and quarried (1).....	841,116		1,151,064	
Total gypsum calcined (2).....	95,655		119,677	
IMPORTS—				
Gypsum, crude (sulphate of lime).....	4	150	56	610
Gypsum, ground, not calcined.....	340	9,548	333	11,940
Plaster of Paris or gypsum, calcined, and prepared wall plaster.....	813	19,661	1,380	28,092
Total.....	1,157	29,359	1,769	40,642
EXPORTS—				
Gypsum or plaster, crude.....	650,377	756,010	(x) 841,191	960,711
Plaster of Paris, ground, and prepared wall plaster.....	752	19,280	1,234	29,552
Total.....	651,129	775,290	842,425	990,263

(1) Includes some anhydrite quarried in Nova Scotia.

(2) Does not include gypsum calcined in manufacturing plants located in Montreal and Calgary.

(x) 735,125 tons at \$851,518 to the United States and 103,602 tons at \$106,443 to the United Kingdom.

Table 267.—Annual Production of Gypsum in Canada, by Provinces, 1928-1937

Year	Nova Scotia		New Brunswick		Ontario		Manitoba		British Columbia		Canada	
	Quantity	Value	Quantity	Value	Quantity	Value	Quantity	Value	Quantity	Value	Quantity	Value†
	Tons	\$	Tons	\$	Tons	\$	Tons	\$	Tons	\$	Tons	\$
1928..	1,013,257	1,850,243	75,033	501,252	85,811	553,271	51,285	609,039	20,982	229,843	1,246,368	3,743,648
1929..	948,895	1,152,160	70,482	485,982	100,347	832,689	67,269	631,051	24,696	243,814	1,211,689	3,345,696
1930..	827,063	982,287	82,674	513,677	94,946	776,069	34,157	298,297	32,128	248,458	1,070,968	2,818,788
1931..	707,817	878,487	58,957	451,264	53,358	374,469	23,076	231,124	20,544	176,173	863,752	2,111,517
1932..	341,508	398,861	38,019	297,520	35,655	186,175	12,719	113,739	10,728	84,084	438,629	1,080,379
1933..	315,948	363,528	30,391	88,500	24,460	112,319	6,830	65,471	5,107	46,004	382,736	675,822
1934..	318,217	488,044	30,398	104,709	33,234	141,389	9,657	81,553	9,661	48,081	461,237	863,776
1935..	454,703	523,216	30,796	105,960	38,247	164,807	10,500	85,885	7,618	52,335	541,864	932,203
1936..	729,019	808,294	38,470	123,560	40,191	182,783	12,064	87,076	14,078	77,258	833,822	1,278,971
1937..	926,796	978,288	36,906	131,727	53,780	233,895	13,941	88,095	15,764	108,478	1,047,187	1,540,483

†Gross.

Table 268.—Consumption of Gypsum in Canadian Cement Industry, 1930-1937

Year	Tons	Year	Tons
1930.....	74,227	1934.....	19,172
1931.....	56,677	1935.....	21,611
1932.....	27,537	1936.....	25,447
1933.....	13,319	1937.....	33,691

Table 269.—Principal Statistics of the Gypsum Mining Industry in Canada, 1935-1937

		Nova Scotia	New Brunswick, Ontario, Manitoba, British Columbia	Total Canada
Number of firms.....	1935.....	4 (*)	3	6
	1936.....	7 (*)	3	9
	1937.....	5 (*)	4	8
Capital employed.....	1935..... \$	3,129,545	2,607,569	5,737,114
	1936..... \$	5,095,747	3,858,907	8,954,654
	1937..... \$	4,178,656	2,723,566	6,902,222
Number of employees—	On salary—			
	1935.....	20	34	54
	1936.....	32	32	64
	1937.....	(a) 25	(b) 36	61
	On wages (d)—			
	1935.....	199	214	413
	1936.....	244	206	450
	1937.....	312	229	541
Salaries and wages—	Salaries—			
	1935..... \$	33,560	59,790	93,350
	1936..... \$	35,665	53,121	88,786
	1937..... \$	44,903	65,469	110,372
	Wages—			
	1935..... \$	130,347	143,310	273,657
	1936..... \$	191,184	160,327	351,511
	1937..... \$	267,875	217,149	485,024
Fuel and electricity—	Cost—			
	1935..... \$	45,184	76,430	121,614
	1936..... \$	54,061	86,597	140,678
	1937..... \$	67,743	88,372	156,115
Value of process supplies used—				
	1935..... \$	23,973	41,440	65,413
	1936..... \$	38,763	39,428	78,191
	1937..... \$	67,167	39,795	106,962
Selling value of products (net)—				
	1935..... \$	454,059	291,117	745,176
	1936..... \$	715,450	344,652	1,060,102
	1937..... \$	843,378	434,028	1,277,406

(*) Includes one company also operating in Nova Scotia.

(a) 23 male, 2 female. (b) 32 male, 4 female. (d) all male.

Table 270.—Capital Employed in the Gypsum Industry in Canada, by Provinces, 1937

	Nova Scotia	New Brunswick, Ontario, Manitoba and British Columbia	Canada
	\$	\$	\$
Capital employed as represented by—			
(a) Present cash value of the land (excluding minerals).....	2,061,340	372,053	2,433,393
(b) Present value of buildings, fixtures, machinery, tools and other equipment..	934,180	1,513,924	2,448,104
(c) Inventory value of materials on hand, ore in process, fuel and miscellaneous supplies on hand.....	301,796	113,583	415,379
(d) Inventory value of finished products on hand.....	13,296	55,432	68,728
(e) Operating capital (cash, bills and accounts receivable, prepaid expenses, etc.).	868,044	668,574	1,536,618
Total.....	4,178,656	2,723,566	6,902,222

Table 271.—Number of Wage-earners on Payroll or Time Record on the 15th of Each Month or Nearest Representative Date, 1937

Month	1937		
	Mine		Mill
	Surface	Under- ground	
January.....	55	63	156
February.....	45	63	135
March.....	47	70	208
April.....	243	74	197
May.....	314	82	230
June.....	333	90	281
July.....	381	87	239
August.....	391	78	230
September.....	389	88	233
October.....	402	86	227
November.....	303	76	216
December.....	171	68	160

(2) The Gypsum Products Industry

Nine plants owned and operated by four companies manufactured gypsum products in Canada during 1937 and their output was valued at \$2,525,507 compared with \$1,970,822 in 1936 and \$1,418,793 in 1935. Gypsum wallboard and hard wall plaster were the chief products but other lines, such as gypsum blocks, tile, stucco, insulex, etc., were of considerable importance.

Capital invested in the industry was reported at \$2,756,165 in 1937, and employment was given to a monthly average of 243 people who received \$232,244 in salaries and wages. Materials used in manufacturing cost \$1,002,568 and fuel and electricity cost \$109,770.

Table 272.—Principal Statistics of the Gypsum Products Industry, 1936 and 1937

	1936	1937
Number of establishments.....	9	9
Capital employed.....	\$ 2,766,619	\$ 2,756,165
Number of employees.....	217	243
Salaries and wages.....	\$ 219,495	\$ 232,244
Cost of fuel and electricity.....	\$ 77,415	\$ 109,770
Cost of materials at works.....	\$ 798,799	\$ 1,002,568
Selling value of products at works.....	\$ 1,970,822	\$ 2,525,507

Table 273.—Output of the Gypsum Products Industry, 1936 and 1937

Products	Unit of measure	1936		1937	
		Quantity	Selling value at works	Quantity	Selling value at works
			\$		\$
Gypsum wallboard.....	sq. ft.	42,863,567	996,308	58,319,517	1,372,476
Gypsum hard wall plasters.....	Short ton	57,138	804,973	63,786	877,840
All other products (*).....			169,541		275,191
Total			1,970,822		2,525,507

(*) Includes gypsum tile, gypsum blocks, etc.

Table 274.—Materials Used in the Gypsum Products Industry, 1936 and 1937

	Unit of measure	1936		1937	
		Quantity	Cost at works	Quantity	Cost at works
			\$		\$
Gypsum, crude.....	Short ton	17,057	70,011	18,568	79,122
Gypsum, calcined (plaster of Paris).....	"	72,233	359,755	82,811	436,723
Paper.....	"	3,952	184,223	5,001	245,330
Starch or paste.....	"	162	25,934	188	31,070
Hair.....	"	85	14,380	96	20,339
Retarder.....	"	165	10,718	132	13,295
Sawdust or shavings.....	"	402	3,747	211	2,441
Containers, etc.....	xxx		80,785		92,606
All other materials.....	xxx		49,246		81,642
Total	xxx		798,799		1,002,568

Table 275.—World Production of Gypsum, 1935-1937

(Supplied by Imperial Institute)

(Long tons)

Producing Country	1935	1936	1937	Producing Country	1935	1936	1937
BRITISH EMPIRE				FOREIGN COUNTRIES CON.			
United Kingdom.....	981,913	1,002,472	1,094,109	Latvia (exports).....	97,372	121,552	193,802
(a).....		6,000	11,463	Luxemburg.....	29,008	28,650	19,411
Eire.....	21,249	31,457	36,582	(a).....			11,210
Union of South Africa.....	502,206	750,996	1,027,736	Portugal.....	61,058	43,296	(a)
Canada.....	16,000	13,000	15,000	Roumania (b).....	167	92	106
Cyprus (estimated).....	4,471	6,111	3,872	Sweden.....	10,000	10,000	10,000
Palestine.....	45,318	54,404	46,090	Yugoslavia (estimated).....	54,476	44,575	40,490
India.....	118,136	125,584	155,209	Algeria.....	187,655	(b)252,164	(b)249,634
Australia.....				Egypt.....	25,000	25,000	22,400
FOREIGN COUNTRIES				Tunis.....	59,944	60,736	(c)70,000
Austria.....	38,000	48,000	(a)	Mexico.....	1,699,893	2,421,884	2,730,505
Estonia.....	6,139	13,630	12,547	United States.....	48,987	54,826	(a)
France.....	1,255,000	1,354,000	1,300,000	Argentina.....	25,738	22,316	(a)
Germany.....	952,000	(a)	1,657,000	Chile.....	8,813	12,362	(a)
Greece.....	4,800	13,561	17,641	Peru.....	70,000	70,000	70,000
Italy (including alabaster).....	463,726	319,659	409,625	China (estimated).....	135,503	(a)	(a)
				Japan.....			969
				New Caledonia.....			

Gypsum is also produced in Poland, Spain, Switzerland, U.S.S.R., French Morocco, Brazil, Cuba and Korea.

(a) Information not available.

(b) Converted from cubic metres at the rate of 1 cubic metre=2 long tons.

(c) Estimated.

IRON OXIDES (OCHRE) MINING INDUSTRY

Production (producers' sales) in Canada during 1937 of iron oxides, crude and calcined, totalled 6,197 short tons valued at \$83,640 compared with 5,854 short tons at \$69,630 in 1936. Both the quantity and value of shipments during the year under review were the greatest since 1930. Of the output in 1937 properties in the province of Quebec contributed 5,617 tons, worth \$77,640 while the balance of Canadian production originated in British Columbia.

In 1937 the consumption of oxide or purifying materials by the Canadian coke and gas industries was estimated at \$40,414 while relatively large quantities of iron oxides, including ochres, siennas and umbers were used in Canada for the manufacture of paints and pigments.

Imports into Canada of ochres, ochrey earths, siennas and umbers totalled 1,623 short tons valued at \$56,084 in 1937 and of these 1,101 short tons worth \$35,510 came from the United States, 289 tons at \$8,952 from France and 173 tons at \$8,353 from the United Kingdom.

The number of operators comprising the Canadian Iron Oxides Industry in 1937 totalled six, of which five reported commercial shipments during the year. In Quebec the minerals were shipped from deposits occurring at St-Adelphé, Almaville, La Pointe du Lac and Red Mill in Champlain county. At Lacoste in the same province the Iron Oxide Products Co. Ltd., commenced the construction of a new plant with an estimated capacity of ten tons per day. Production of ochres or bog iron in British Columbia in 1937 came entirely from deposits situated near Mons; shipments from here were consigned solely to gas plants located in Vancouver and Victoria.

Mineral pigments have been produced in Canada for many years. In 1851 an important deposit of ochre was worked in Quebec at Pointe du Lac, St. Maurice county. These pigments, as produced in Canada in 1886 and classified as iron oxides, amounted to 350 tons valued at \$2,350. The annual variation in production has been considerable since that date; the low point for the industry being reached in 1890 when 275 tons were extracted, while the maximum output, 19,128 tons, valued at \$157,909, was attained in 1920. The mineral in the crude condition as shipped by Canadian producers is utilized as a purifying agent in the manufacture of heating or illuminating gas, while the calcined or higher grades are consumed in the paint and pigment industries.

In 1937 the Chemical Trade Journal, London, announced that the output of iron oxides in Germany had increased considerably during the last two years, due partly to the improved methods that had been adopted for the economic utilization of all kinds of iron liquor and chemical waste materials. Iron oxide is now used in greater quantities in Germany as a substitute for red lead as a rust proofing and corrosion-resistant medium. Production figures are not available but the expansion in output is indicated by the sharp reduction in imports which dropped from 5,385 metric tons in 1934 to 90 metric tons in 1936; exports, on the other hand, advanced gradually from 10,410 metric tons in 1934 to 13,696 in 1936.

Table 276.—Production in Canada, Imports and Exports of Iron Oxides, 1936 and 1937

	1936		1937	
	Quantity	Value	Quantity	Value
	Tons	\$	Tons	\$
PRODUCTION (SALES) (*)—				
Quebec.....	5,458	65,630	5,617	77,640
British Columbia.....	396	4,000	580	6,000
Total.....	5,854	69,630	6,197	83,640
IMPORTS—				
Ochres, ochrey earths, siennas and umbers.....	1,506	49,750	1,623	56,084
Oxides, fireproofs, rough stuff, fillers and colours, dry, n.o.p.....	2,999	721,614	4,042	844,149
EXPORTS—				
Mineral pigments, iron oxides, ochres, etc.....	1,572	92,011	1,755	105,240

(*) Includes both crude and refined.

Table 277.—Production of Iron Oxides in Canada, 1928-1937

Year	Quantity	Value	Year	Quantity	Value
	Tons	\$		Tons	\$
1928.....	5,414	111,198	1933.....	4,357	53,450
1929.....	6,518	115,932	1934.....	4,959	66,166
1930.....	6,596	83,873	1935.....	5,516	77,075
1931.....	5,520	49,205	1936.....	5,854	69,630
1932.....	5,240	46,161	1937.....	6,197	83,640

Table 278.—Consumption of Iron Oxides in Specified Canadian Industries, 1932-1937

Years	Coke and Gas		Paints, pigments and varnishes		Paints, pigments and varnishes	
	Quantity	Value	Quantity	Value	Quantity	Value
	Tons (a)	\$	Tons (b)	\$	Tons (c)	\$
1932.....	3,736	35,284	701	52,323	512	48,037
1933.....	2,734	29,076	504	43,826	491	43,671
1934.....	3,757	47,010	580	53,529	544	53,236
1935.....	3,701	46,204	990	77,758	564	56,219
1936.....	(d)	41,291	733	67,850	634	65,819
1937.....	(d)	40,414	890	81,709	566	49,082

(a) Oxide or purifying materials.

(b) Iron oxide pigments.

(c) Ochres, siennas and umbers.

(d) Data not available.

Prices.—CANADIAN—October, 1938*

Iron Oxides—Red. 2 cents to 6½ cents per pound.

Yellow. 5 cents to 8½ cents per pound.

Brown. 5 cents to 6½ cents per pound.

Black. 3½ cents to 7½ cents per pound.

Siennas. 5 cents to 7½ cents per pound.

Umbers. 4½ cents to 5 cents per pound.

*Canadian Chemistry and Metallurgy, Toronto.

Prices—UNITED STATES—November, 1938.

Iron Oxide per pound: standard (No. 1 quality) Spanish red, 3 to 4 cents nominal; domestic earth 2½ to 4½ cents.

Ochre per ton, f.o.b. Georgia mines; \$19 in sacks; \$22.50 in barrels. Buff clay, 98 per cent through 325 mesh, \$19. f.o.b. Virginia, dark yellow, 300 mesh, 60 per cent ferric oxide, in jute bags, \$19.50.*

*Engineering and Mining Journal—Metal and Mineral Markets, New York.

Table 279.—Principal Statistics of the Natural Iron Oxides Industry in Canada, 1935-1937

	1935	1936	1937
Number of firms.....	5	(a)6	(b)6
Capital employed.....\$	175,935	167,499	212,248
Number of employees—On salaries.....	2	3	(c)6
On wages.....	30	36	44
Total.....	32	39	50
Salaries and wages—Salaries.....\$	3,472	3,792	8,770
Wages.....\$	23,276	26,489	26,598
Total.....\$	26,748	30,281	35,368
Selling value of products (gross).....\$	77,075	69,630	83,640
Cost of fuel and purchased electricity.....\$	12,229	10,909	13,368
Cost of process supplies.....\$	10	510	510
Selling value of products (net).....\$	64,836	58,211	69,762

(a) Four (4) producing
(c) includes 1 female.

(b) Five (5) producing, 1 in B. C. and (4) in Que.

Table 280.—Capital Employed in the Iron Oxides Industry in Canada, 1937

	\$
CAPITAL EMPLOYED AS REPRESENTED BY:	
(a) Present cash value of the land (excluding minerals).....	41,076
(b) Present value of buildings, fixtures, machinery, tools and other equipment.....	114,773
(c) Inventory value of materials on hand, ore in process, fuel and miscellaneous supplies on hand.....	34,083
(d) Inventory value of finished products on hand.....	17,256
(e) Operating capital (cash, bills and accounts receivable, prepaid expenses, etc.).....	6,060
Total	213,248

Table 281.—Wage-Earners Employed, by Months, 1935-1937

Months	Number				Months	Number			
	1935	1936	1937			1935	1936	1937	
			Mine	Mill				Mine	Mill
January.....	38	26	.....	22	July.....	29	51	35	28
February.....	21	25	.....	22	August.....	34	60	35	26
March.....	22	25	13	23	September.....	42	49	22	23
April.....	21	24	8	24	October.....	36	44	16	30
May.....	28	29	17	40	November.....	26	34	13	32
June.....	31	38	34	30	December.....	28	26	8	32

THE MICA MINING INDUSTRY

Production of new mica in Canada during 1937 totalled 945 short tons valued at \$133,731, compared with 801 short tons at \$74,556 in the preceding year. The tonnage shipped in 1937 was the largest since 1934 and its value the greatest since 1927. Of the 945 short tons comprising the 1937 output, 667 short tons valued at \$10,468 represented scrap and ground mica, 53 tons at \$12,090 rough cobbled grades, 102 short tons at \$66,852 knife-trimmed grades, 87 short tons at \$11,826 thumb-trimmed mica, and 36 tons of splittings valued at \$32,495.

Commercial shipments of new mica in 1937 were reported by producers operating only in Quebec and Ontario; the value of sales credited to Quebec mines in 1937 totalled \$124,594 compared with a corresponding value of \$9,137 recorded for Ontario producers. In addition to the output of mica recorded as produced in Eastern Canada during 1937, there was a relatively small tonnage of flake muscovite unofficially reported as having been produced in British Columbia.

The largest annual output of new mica by the Canadian mica mining industry occurred in 1924 in which year shipments reached a total of 4,091 short tons of which Quebec mines contributed 2,414 tons and those in Ontario, 1,677 tons; the greatest value of any yearly production was that of \$376,022 for 2,203 short tons in 1920.

In 1937 Canadian mica mining firms numbered 34 and of these, 28 were located in the province of Quebec and 6 in Ontario. Capital employed by the entire industry amounted to \$150,569, employees totalled 199, and salaries and wages aggregated \$97,547.

The following information relating to Canadian mica has been abstracted from a report prepared by Mr. H. S. Spence of the Bureau of Mines, Ottawa:

"The production of sheet mica in Canada is almost wholly of the phlogopite, or amber mica, variety. It is derived almost entirely from adjacent sections of Ontario and Quebec, within an area extending roughly from Kingston, on Lake Ontario, northeastward into Hull and Papineau counties, Quebec. The mica-bearing series (pyroxenites) is probably continuous throughout this entire region, but is hidden for some distance south of the Ottawa river by a belt of later, sedimentary rocks. In Quebec, the pyroxenites extend also for some distance both west and east of the main productive area, into Pontiac and Argenteuil counties, respectively, but production from these districts has been comparatively small. A few scattered amber mica occurrences are also known in the province as far east as Quebec city, but very little mining has been conducted on them.

"Production of muscovite, or white mica, in Canada has been negligible. Small amounts have been recovered occasionally as a by-product from feldspar mining, but, in general, the proportion of sound, merchantable sheet mica in Canadian pegmatites has proved too low for profitable mining for this mineral alone. Some operations, mostly prospecting, were also reported in 1937 on muscovite deposits in the Saguenay region, on the lower St. Lawrence, Quebec, and a small production of this class of mica came from a deposit in Ryerson Township, near Burk's Falls, Ontario.

"Reference has been made in recent reviews (1935 and 1936) to an unusual kind of deposit of fine flake muscovite, or sericite, at Baker Inlet, near Prince Rupert, B.C., the material of which on account of its extremely friable nature and ease of grinding, should prove eminently suitable for the production of mica powder. The deposit is controlled by P. M. Ray, 23 Besner Block, Prince Rupert, who reports further development during the year.

"Sheet mica is marketed in various classes, depending on the amount of preparation the mine-run material receives. Formerly, much of the Canadian output was sold in the semi-rough form, termed "thumb-trimmed", but owing to stricter trade requirements this practice has now been largely supplanted by knife-trimming, which provides a much higher-grade of product. Scrap mica, representing the waste from mining or trimming, is sold to grinding mills for the production of mica powder, used extensively in the roofing and rubber trades. Most of the scrap so sold is consigned to mills in the United States.

"Canada shares the world market for amber mica with Madagascar, the two countries constituting the principal known sources of this variety. The depression in the Canadian industry in recent years has been largely attributable to the competition of more-cheaply produced Madagascar mica, this being especially pronounced in the case of splittings, a product in which labour costs are particularly vital. The abundant supply of cheap, skilled native labour, both in India (the main world source of muscovite mica) and Madagascar, has reduced the making of all classes of splittings to small proportions on the American continent. There appears, however, to have been some increase in the Canadian production of splittings in 1937. The better grades of Canadian amber mica are considered superior in point of heat-resistance to much of the Madagascar product, and the improvement in trimming practice has resulted in a revived interest by the British trade in Canadian supplies of sheet mica for heaters, as well as for use in heavy-duty spark-plugs for aeroplanes. The recent general improved demand for mica is largely attributable to increased consumption for armaments.

"Four plants now exist in Canada for the expanding by heat-processing of the hydrated variety of mica known as vermiculite. This mineral expands tremendously when heated, yielding an exceedingly light-weight product, which is finding wide application for heat and sound-insulation. Three of the plants, owned by Gypsum, Lime and Alabastine, Canada, Limited, are situated at Calgary, Alberta, Winnipeg, Man., and Paris, Ont.; the fourth was built in 1937 by the W. E. Phillips Company at Oshawa, Ont., the expanded product being marketed by Dominion Insulation Limited, 57 Bloor Street West, Toronto. All these plants draw their supply of crude vermiculite from a deposit at Libby, Montana. No occurrences of this class of mica are known in Canada, though there have been unconfirmed reports of discoveries in British Columbia."

Trade agreements between Canada and the United States and between the United Kingdom and the United States were signed at Washington on Thursday, November 17, 1938. The following statement prepared by the United States Tariff Commission shows the former and new rates of duty on mica in schedule 11 (United States concessions to Canada), and the total imports of mica into the United States and the imports from Canada, according to preliminary United States statistics for the year 1937:—Phlogopite mica waste and scrap valued at not more than 5 cents per pound; under tariff act of 1930 rate of duty, 25 per cent; under 1935 agreement, 25 per cent, under new agreement, 15 per cent. Value of all imports (including muscovite) in 1937, \$36,355; from Canada only, \$11,971 in 1937. Mica, ground or pulverized; under tariff act of 1930 rate of duty, 20 per cent; under 1935 agreement, 20 per cent; under new agreement, 15 per cent; value of imports in 1937, \$1,233, all from Canada. Untrimmed phlogopite mica, small pieces, 15 per cent under tariff act of 1930 and 15 per cent under 1935 agreement; under new agreement, 10 per cent; value of all such imports in 1937 totalled \$9,091, all from Canada.

The United States Bureau of Mines, in "Mineral Trade Notes" states—"No single development in the mica industry is more important at present than the increasing use of wet-ground mica in paint. Potentialities of this use are enormous. In 1936 some ten times as much mica was used in making paint as was used in predepression years, but the quantity was only 1,307 short tons, whereas enthusiasts visualize requirements as high as 100,000 tons annually as a reasonable possibility. In this field, mica supplements as well as replaces asbestine or fibrous talc and is preferably used to the extent of 10 per cent of the pigment. Specifications call for 90 per cent ground through 325 mesh and smoothly rounded edges.

"Higher prices for mica combined with changes in the nature of its uses have increased the demand for small sizes of mica. Until fairly recently the demand was mainly for large unflawed sheets, difficult to find and correspondingly expensive but the United States Bureau of Mines studies show that the modern trend is toward using progressively smaller sizes and that such sizes accordingly have increased in price much more than larger sizes. Important economies were effected by the introduction of splittings which are pasted together with shellac and moulded into plates of any desired size.

"For many years it has seemed that mica was one of the very few substances for which no substitute could be found. Efforts to replace mica with other materials in most of its important electrical uses were invariably unsuccessful. Recent developments forecast that at last a material can be made by centrifuging bentonite that has virtually all the needed characteristics of mica and that the cost will be so low as to eliminate our former dependence upon British India for an essential raw material. Little information is available as yet, but the research is being prosecuted actively by a well-known, capable, private organization, and further developments will be noted with interest by consumers as well as by mica miners."

"Foreign Metals and Minerals"—United States Department of Commerce publication—reported: "England's new industry, the grinding of mica, may free it of its dependence on the United States product and possibly open up a new line in British exports. The United States heretofore dominated world markets in ground or powdered mica. A mica grinding process submitted by Mr. A. A. C. Dickson some years ago to the Imperial Institute has successfully undergone all tests and a plant now in operation is producing ground mica of a quality admirably suited to the needs of industry. In addition to relieving the British industry of its dependence on the foreign product through this new enterprise, an outlet has been found for Indian mica scrap."

Table 282.—Production of Mica in Canada, by Provinces, 1928-1937

Year	Quebec		Ontario		Canada	
	Quantity	Value	Quantity	Value	Quantity	Value
	Tons	\$	Tons	\$	Tons	\$
1928.....	1,101	54,224	2,559	32,944	3,660	87,168
1929.....	1,062	72,630	2,991	45,919	4,053	118,549
1930.....	430	61,729	740	34,275	1,170	96,004
1931.....	290	30,601	1,049	23,465	1,339	54,066
1932.....	41	4,076	268	2,752	309	6,828
1933*	256	39,060	666	9,371	944	49,284
1934*	322	85,967	618	9,059	998	97,071
1935.....	373	74,894	255	7,144	628	82,038
1936.....	272	63,123	529	11,433	801	74,556
1937.....	546	124,594	399	9,137	945	133,731

*Total for Canada includes 22 tons valued at \$853 produced in British Columbia in 1933 and 58 tons valued at \$2,045 in 1934.

Table 283.—Production of Mica in Canada, by Grades, 1936 and 1937.

	1936			1937		
	Quantity	Value, f.o.b. shipping point	Price per pound	Quantity	Value, f.o.b. shipping point	Price per pound
	Pounds	\$	\$	Pounds	\$	\$
Rough cobbled.....	10,940	2,615	0.24	106,917	12,090	0.11
Knife-trimmed.....	113,169	48,086	0.42	203,961	66,852	0.03
Thumb-trimmed.....	35,289	3,233	0.09	173,519	11,826	0.07
Splittings.....	24,376	9,780	0.40	72,500	32,495	0.45
Scrap (*).....	1,417,783	10,842	0.008	1,333,479	10,468	0.008
Total.....	1,601,557	74,556		1,890,376	133,731	

(*) Includes ground mica.

Table 284.—Imports and Exports of Mica, 1936 and 1937

	1936		1937	
	Pounds	Value	Pounds	Value
IMPORTS—		\$		\$
Mica and manufactures of, n.o.p.—				
From—United Kingdom.....		15,491		9,298
United States.....		45,790		52,654
British India.....		12,412		21,165
Germany.....		3,761		408
Other countries.....		368		71
Total.....		77,822		83,596
Chalk, China, Cornwall or cliff stone and mica schist.....		32,253		55,558
EXPORTS—				
Mica, rough, cobbled, knife-trimmed and thumb-trimmed—				
To—United Kingdom.....	103,200	52,350	127,700	77,332
United States.....	61,200	7,659	113,500	19,675
Other countries.....	3,900	1,465	13,200	1,897
Mica, scrap and waste—				
To—United States.....	2,473,600	14,152	2,443,300	13,042
Mica splittings—				
To—United Kingdom.....	5,100	1,415		
United States.....	21,800	8,916	131,600	56,970
Other countries.....			1,000	444
Mica plate and manufactures of (micanite).....		1,343		2,410
Total.....		87,300		171,770

Table 285.—Consumption of Mica in Canada by Industries, as Reported to the Annual Census of Industry, 1936 and 1937

	1936		1937	
	Quantity	Cost at works	Quantity	Cost at works
	Tons	\$	Tons	\$
In Electrical Apparatus Industry.....		77,336		87,829
In Rubber Industry.....	61	5,358	71	6,190
In Roofing Industry.....	90	2,522	143	4,141
In Mica Manufacturing Industry.....	8	7,790	21	16,675
In Paints Industry.....	1	45		
In Coal Tar Distillation Industry.....	29	945	9	284
In Iron Foundry Industry†.....	182	1,945	117	1,292
Total accounted for.....		95,941		116,411

† Includes sheet and schist.

Canadian dealers' quotations at the end of 1937 were as follows:—

Knife trimmed sheet	Per pound	Splittings	Per pound
	\$		\$
1 x 3 inches.....	0.50	1 x 1 inches.....	0.45
2 x 3 inches.....	0.75	1 x 2 inches.....	0.50
2 x 4 inches.....	1.00		
3 x 5 inches.....	1.75		
4 x 8 inches.....	2.25		
5 x 8 inches.....	3.00		

Ground mica, 20 mesh, \$25 per ton; 60 mesh, \$30; 120 mesh, \$45; all prices f.o.b. Ottawa, in ton lots. (Bureau of Mines, Ottawa.)

The Engineering and Mining Journal, New York (Metal and Mineral Markets) quoted United States mica prices, November, 1938, as follows:—per ton, f.o.b. New Mexico, scrap, white, \$14; off color, \$10. Punch, white, for disks, per pound, 12 cents; for washers, 9 cents. Per ton, f.o.b. New Hampshire, roofing mica, \$23; snow, \$34; 40 mesh white, \$40; 60 mesh, \$48; 100 mesh, \$60; 200 mesh, \$75. Clean dry mixed bench and mine scrap, \$13. Per pound, f.o.b. North Carolina, punch, 3 to 5 cents; 1½ x 2 inch, 15 to 40 cents; 2 x 2, 30 to 60 cents; 3 x 3, 75 cents to \$1.20; 3 x 4 inch, \$1 to \$1.40; 3 x 5, \$1.25 to \$1.60; 4 x 6, \$2 to \$2.50; 6 x 8, \$2.50 to \$3.50; 8 x 10, \$3.50 to \$5; these prices apply to No. 1 and No. 2 quality stock. Stained qualities take from 10 to 25 per cent discount. White North Carolina mica, 70 mesh, \$60 to \$80 per ton. Biotite or black mica, \$15 a ton unground. White, Georgia, 300 mesh, \$19.50; sericite, 300 mesh, \$15; mica schist, 20 mesh, \$14.

Table 286.—Principal Statistics of the Mica Mining Industry in Canada, 1936 and 1937

	1936	1937		
		Quebec	Ontario	Canada*
Number of firms.....	22	28	6	34
Capital employed..... \$	221,800	116,265	34,304	150,569
Number of employees—On salary.....	3	8	1	9
On wages.....	98	187	3	190
Total.....	101	195	4	199
Salaries and wages—Salaries..... \$	3,565	5,591	2,175	7,766
Wages..... \$	40,985	88,176	1,605	89,781
Total..... \$	44,550	93,767	3,780	97,547
Selling value of products (gross)..... \$	74,556	124,594	9,137	133,731
Cost of fuel and electricity..... \$	1,351	3,768		3,768
Cost of process supplies used..... \$	3,473	13,728	50	13,778
Selling value of products (net)..... \$	69,732	107,098	9,087	116,185

(*) Does not include data for one operation in British Columbia for which statistics are not available.

Table 287.—Capital Employed in the Mica Mining Industry in Canada, by Provinces, 1937

	Quebec	Ontario	Canada†
	\$	\$	\$
CAPITAL EMPLOYED AS REPRESENTED BY:			
(a) Present cash value of the land (excluding minerals).....	46,705	24,761	71,466
(b) Present value of buildings, fixtures, machinery, tools and other equipment..	11,224	4,349	15,573
(c) Inventory value of materials on hand, ore in process, fuel and miscellaneous supplies on hand.....	20,253	1,885	22,138
(d) Inventory value of finished products on hand.....	931	1,437	2,368
(e) Operating capital (cash, bills and accounts receivable, prepaid expenses, etc.)	37,152	1,872	39,024
Total.....	116,265	34,304	150,569

† Does not include data for 1 property in British Columbia.

Table 288.—Number of Wage-Earners on Payroll or Time Record on 15th of Each Month or Nearest Representative Date, 1937

Month	1937		
	Shop		
	Mine	Male	Female
January.....	63	48	2
February.....	87	53	2
March.....	88	59	2
April.....	90	61	3
May.....	103	66	9
June.....	100	73	9
July.....	117	94	11
August.....	111	94	12
September.....	108	101	20
October.....	101	105	11
November.....	106	99	6
December.....	88	81	4

Table 289.—World Production of Mica, 1935-1937

(Imperial Institute, London)

(Long tons)

Producing Country	1935	1936	1937	Producing Country	1935	1936	1937
BRITISH EMPIRE				FOREIGN COUNTRIES			
Northern Rhodesia.....	2	3	4	Italy.....	33	12	(a)
Southern Rhodesia.....	4	9	16	Norway (exports).....	56	43	41
Tanganyika Territory—				Roumania.....	(c)	81	26
Sheet.....	25	10	33	Sweden.....	31	123	67
Waste.....	21	23	40	U.S.S.R.....	8,143	(a)	(a)
Union of South Africa (b)...	573	488	1,712	Madagascar—			
Canada—				Muscovite.....	(1,917 lb.)		
Knife trimmed.....	50	50	91	Phlogopite, etc.....	513	404	601
Thumb trimmed.....	5	16	78	United States (sales)—			
Splittings.....	15	11	32	Sheets (uncut).....	418	589	756
Rough cobbed.....	14	5	48	Scrap.....	16,832	18,710	22,496
Scrap.....	477	633	595	Argentina.....	221	206	(a)
Ceylon (exports).....	2		1	Bolivia (exports).....	2		9
India (exports)—				Brazil (exports).....	108	233	325
Sheet.....	1,189	1,362	1,500	Korea.....	86	69	(a)
Splittings.....	5,902	7,521	13,367				
Australia.....	44	21	84				

(a) Information not available.

(b) Nearly all scrap.

(c) 10 cubic metres.

The following amounts of lithia mica were produced:—

	1935	1936	1937
South West Africa	489	852	1,030 long tons.
France.....	350	400	(a) “
Portugal.....	8	—	109 “
United States (lithium minerals).....	1,030	1,106	1,212 “
Argentina.....	—	60	(a) “
Canada.....	—	—	(£342)

THE SALT INDUSTRY

Canadian salt production in 1937 totalled 458,957 short tons valued at \$1,799,465 compared with 391,316 short tons worth \$1,773,144 in 1936. This represents an increase of 17·3 per cent in quantity and 1·5 per cent in value and the tonnage shipped or used during 1937 established an all time high record in the production of the mineral in the Dominion. In 1937 salt was produced in Nova Scotia, Ontario and Manitoba and of the total Canadian output Ontario producers accounted for 407,701 short tons valued at \$1,539,599.

The number of firms producing salt in Canada during 1937 totalled 9, capital employed amounted to \$4,001,568, employees were reported at 543, salaries and wages aggregated \$653,136, and the net value of production was recorded at \$1,540,401.

Consumption of salt in the manufacture of chemicals continues to increase and the chemical industry is the largest single consumer of the commodity in Canada. In 1937 the tonnage of salt used only by primary producers of the mineral, for the manufacture of chemicals, was 205,149 as against 165,882 during 1936. Factories in the fish canning and curing industries used 20,317 short tons of salt in 1937 and in the same period a tonnage of 6,149 was consumed in the pulp and paper mills of Canada.

Soil stabilization with salt and clay for the foundation of highways and for a surface veneer for gravel roads is now firmly established and the use of salt for this purpose is increasing steadily.

Salt imported into Canada in 1937 totalled 116,460 short tons valued at \$466,190 and of this quantity, 38,643 tons at \$106,703 were specified as material for use in the sea and gulf fisheries. Exports of salt during 1937 amounted to 9,329 short tons appraised at \$61,522 and of these shipments, 6,363 tons were consigned to the United States. Imports in 1937 of muriate of potash as

a fertilizer, together with various other potassium compounds, amounted to 100,669,121 pounds valued at \$1,548,199; caustic soda imports during the same period totalled 12,939,268 pounds; those of soda bicarbonate were recorded at 12,835,249 pounds and liquid or gaseous chlorine imports totalled 7,947,320 pounds.

Salt production in Nova Scotia represents the output of the Malagash rock salt mine located on the Malagash Peninsula, Cumberland county. According to the Department of Public Works and Mines, Nova Scotia, the Malagash Salt Co. Ltd., in 1937, had the largest production in the history of its operations, in spite of curtailment of operations forced upon them during the early months by a serious breakdown of part of the diesel plant. All work was confined to the Lucas seam levels between levels 20 and 13. A complete survey of the mine with underground contours along the Lucas seam, together with diamond drilling, were carried out by the Department in order to pick up extensions of salt bodies. Considerable experimental work with the use of salt in the sub-grades of permanent highways has been carried out.

In Ontario, Manitoba, Saskatchewan and Alberta, salt is obtained from brine wells. Production in Ontario comes entirely from the southern part of the province where, in 1937, brines were processed by the Dominion Salt Co. Ltd., Goderich Salt Co. Ltd., Warwick Pure Salt Co. Ltd., Western Canada Flour Mills Co. Ltd., Canadian Industries Limited, and Brunner, Mond Canada, Limited.

Caustic soda, chlorine and hydrochloric acid are now manufactured by Canadian Industries Limited from salt obtained from the company's wells located at Sandwich. This company operates chemical plants at Windsor and Cornwall and in June, 1937, commenced the erection of a caustic soda-chlorine plant at Shawinigan Falls, Quebec.

The Brunner, Mond Canada, Limited, located at Amherstburg, Ontario, manufactures soda ash from natural brine; calcium chloride is also recovered as a by-product by this company.

In Manitoba the Neepawa Salt Ltd., conducted continuous operations during 1937 at its Neepawa plant; a copper-lined steam-driven centrifuge has been installed by this company and the salt is now put through this machine directly from the grainers.

According to a report issued by the Bureau of Mines, Ottawa, exploratory drilling was carried on in the vicinity of Thunder Hill on the Saskatchewan-Manitoba boundary, southwest of Swan River, also some interest was shown during the latter part of the year in the salt springs on the west shore of Lake Winnipegosis, Manitoba. A new company, the Northern Salt Syndicate, is planning to erect a small plant on some springs near the mouth of the Red Deer River where it runs into Lake Winnipegosis.

At Fort McMurray, Alberta, Industrial Minerals Ltd., in December, 1937, completed the erection of a plant for the production of salt from brines obtained from rock salt deposits; open pans are being employed for the evaporation of the brine and a number of grades of salt will be produced; shipments from this property commenced during the first six months of 1938.

The Bureau of Mines, Ottawa, also reports that the extent of the salt basin in New Brunswick, south of Moncton, was further determined when the New Brunswick Gas and Oilfields, Ltd., in drilling for oil at Weldon, N.B., encountered nearly 900 feet of salt formation consisting of beds of rock salt interbanded with narrow beds of anhydrite or silt.

Near Amherst, Cumberland county, Nova Scotia, a well put down by Imperial Oil Limited, in search for oil and gas, encountered 3,200 feet of alternating beds of salt, anhydrite, dolomite, limestone and shale, the salt constituting 45 per cent of the whole.

It is also interesting to note that potassium chloride occurs in a number of definite bands in the salt deposit at Malagash, Nova Scotia.

"According to the annual report for 1937 of the Safety in Mines Research Board, coal dust explosions formed a large proportion of the experiments carried out during the year at Buxton Research station and the efficacy of special dusts for suppressing the inflammability of the coal dust was tested. Common salt is one of the most effective, and it has been found that the tendency to cake is reduced by a mixture of French chalk, precipitated chalk or coal.

"The frequently debated question of the actual value of common salt as a fertilizer is discussed by I. W. Selman, B.Sc., Ph.D., of the Rothamsted Experimental Station in the 'Journal of the Ministry of Agriculture' Vol. XLV—No. 3—June, 1938. The effects of sodium chloride upon the plant are summarized thus by Dr. Selman: (1) The sodium ion has been demonstrated to be a useful, though not always essential, plant nutrient. The response of plants that are tolerant to salt (mangolds, oats, sugar beet, asparagus, etc.) may be expected to be controlled by the levels of the other plant nutrients (lime, phosphate, potash, etc.) in the soil. (2) At Rothamsted, sodium chloride has been found to be slightly superior to potassium chloride for sugar-beet. (3) In dry seasons there is some evidence to show that sodium chloride increases the drought-resisting properties of the leaves. High concentrations of chlorides exert a deleterious effect on vegetation." (Chemical Trade Journal and Chemical Engineer, London.)

Table 290.—Production of Salt in Canada, by Grades, 1936 and 1937

Grade	1936			1937		
	Manu- factured	Sold	Value of sold sold (*)	Manu- factured	Sold	Value of salt sold (*)
	Tons	Tons	\$	Tons	Tons	\$
Table, dairy and pressed blocks.....	77,428	76,567	867,215	78,641	76,908	810,090
Common, fine.....	81,646	83,095	358,776	104,203	104,968	404,598
Common, coarse.....	27,477	28,162	218,176	22,858	23,676	182,228
Highway salt.....	(a)	(a)	(a)	1,969	1,969	6,229
Land salt.....	1,061	1,046	3,780	42	89	466
Other grades.....	38,364	36,564	159,315	45,695	46,198	190,705
Brine for chemical works (salt equivalent sold or used).....	165,882	165,882	165,882	205,149	205,149	205,149
Total.....	391,858	391,316	1,773,144	458,557	458,957	1,799,465
Value of containers.....			527,647			534,551
Grand Total.....	391,858	391,316	2,300,791	458,557	458,957	2,334,016

(*) Not including containers.
(a) Not shown separately prior to 1937.

Table 291.—Production of Salt by Provinces, 1928-1937

Year	Nova Scotia		Ontario		Manitoba		Saskatchewan	
	Tons	Value	Tons	Value	Tons	Value	Tons	Value
1928.....	19,604	\$ 118,342	279,841	\$ 1,377,629		\$		\$
1929.....	27,819	157,662	302,445	1,420,424				
1930.....	23,058	136,226	248,637	1,558,405				
1931.....	27,718	143,761	231,329	1,760,388				
1932.....	31,897	150,708	231,138	1,789,751	508	7,092		
1933.....	34,278	161,889	244,107	1,755,087	1,499	18,388	231	4,510
1934.....	42,886	191,917	276,751	1,734,196	1,664	20,137	452	8,703
1935.....	38,701	161,659	320,003	1,698,508	1,538	18,765	101	2,046
1936.....	38,774	183,915	350,044	1,557,078	2,498	32,151		
1937.....	47,865	216,401	407,701	1,539,599	3,391	43,465		

Table 292.—Production in Canada, Imports, Exports and Consumption of Salt, 1936 and 1937

	1936		1937	
	Tons	Value	Tons	Value
PRODUCTION.....	391,316	\$ 1,773,144	458,957	\$ 1,799,465
IMPORTS—				
Salt, for the use of the sea or gulf fisheries.....	31,967	99,214	38,643	106,703
Salt, in bulk, n.o.p.....	43,129	148,404	48,186	168,998
Salt, n.o.p., in bags, barrels, etc.....	38,784	212,423	29,576	189,286
Salt, table, made by an admixture of other ingredients, when containing not less than 90 per cent of pure salt.....	42	957	55	1,203
Total.....	108,922	460,998	116,460	466,190
EXPORTS.....	5,549	46,601	9,329	61,522
APPARENT CONSUMPTION OF SALT.....	494,689	2,187,541	566,088	2,204,133

Table 293.—Available Statistics on Consumption of Salt, in Specified Canadian Industries, 1936 and 1937 (*)

Industries	1936		1937	
	Quantity used	Cost at works	Quantity used	Cost at works
	Pounds	\$	Pounds	\$
Fish canning and curing (factories only).....	53,532,600	256,651	40,634,000	208,510
Slaughtering and meat packing.....	70,680,249	398,025	80,296,715	460,248
Acids, alkalies and salts—Brine (salt content) and dry salt.....	386,228,680	318,824	475,553,413	383,549
Soaps and cleaning preparations.....	5,480,103	36,474	4,017,429	14,958
Dyeing, cleaning and laundry work.....	3,723,761	32,333	5,038,703	35,439
Dyeing and finishing of textiles.....	1,331,421	8,694	2,086,511	8,330
Artificial ice.....	1,984,906	8,559	1,998,376	7,176
Abrasives—artificial.....	674,000	2,671	676,000	2,786
Waterworks.....	1,300,000	.....	1,600,000	.....
Leather tanneries.....	11,356,421	42,462	9,480,760	39,288
Pulp and paper mills.....	11,100,000	57,655	12,298,000	63,787
Stock and poultry foods.....	2,744,000	21,200	3,454,000	22,505
Bread and other bakery products.....	13,796,760	131,811	16,919,700	150,569
Fruit and vegetable preparations.....	8,747,050	56,257	9,547,982	63,585
Biscuits, confectionery, etc.....	1,528,040	14,187	1,551,300	13,056
Foods, breakfast.....	1,621,266	11,518	1,693,494	11,864
Sausage and sausage casings.....	1,606,404	9,753	655,897	6,311
Ice cream industry (a).....	1,409,375	11,275	1,314,500	10,516
Breweries.....	278,393	2,194	602,351	8,355
Malt and malt products.....	249,975	1,534	261,119	1,370
Coffee, tea and spices.....	162,993	2,007	368,491	3,036
Macaroni, vermicelli, etc.....	49,671	504	78,796	728
Ice cream cones.....	2,079	17	4,127	30
Foods, miscellaneous.....	782,936	7,421	823,172	8,581

(*) In addition, large quantities of salt are used on highways.

(a) Quantities estimated.

Note:—In addition a relatively small quantity of salt is used in the manufacture of woollen textiles.

Table 294.—Principal Statistics of the Salt Industry in Canada, 1937

Number of firms.....	9
Capital employed.....	\$ 4,001,568
Number of employees—On salary—Male.....	86
Female.....	41
Total.....	127
On wages—Male.....	382
Female.....	34
Total.....	416
Grand Total.....	543
Salaries and wages—Salaries.....	\$ 260,753
Wages.....	\$ 392,383
Total.....	\$ 653,136
Selling value of products (gross).....	\$ 2,334,016
Cost of purchased process materials.....	\$ 75,947
Cost of fuel and electricity.....	\$ 183,117
Value of containers.....	\$ 534,551
Net value of sales.....	\$ 1,540,401

Table 295.—Capital Employed in the Salt Industry in Canada, 1937

Capital employed as represented by—	\$
(a) Present cash value of the land (excluding minerals).....	801,725
(b) Present value of buildings, fixtures, machinery, tools and other equipment.....	2,317,008
(c) Inventory value of materials on hand, salt in process, fuel and miscellaneous supplies on hand.....	268,819
(d) Inventory value of finished products on hand.....	166,074
(e) Operating capital (cash, bills and accounts receivable, prepaid expenses, etc.).....	447,942
Total.....	4,001,568

Table 296.—Wage-Earners, by Months, 1937

(On 15th or nearest representative date)

Month	Male		Female	Total
	Surface	Underground		
January.....	263	56	29	348
February.....	267	66	37	370
March.....	278	66	32	376
April.....	297	69	35	401
May.....	314	81	34	429
June.....	316	76	35	427
July.....	335	86	31	452
August.....	323	86	35	444
September.....	336	80	35	451
October.....	328	72	37	437
November.....	346	72	38	456
December.....	274	67	30	371
Average.....	309	73	34	416

Table 297.—World Production of Salt, 1935-1937

(Imperial Institute)

(Long tons)

Producing Country and Description	1935	1936	1937
BRITISH EMPIRE			
United Kingdom—			
Rock-salt.....	19,539	20,416	22,558
Brine-salt.....	2,680,553	2,812,400	3,061,197
Malta.....	2,000	1,990	1,800
Mauritius (estimated)			
Sea-salt.....	1,500	1,500	1,500
Nigeria (estimated)			
Sea-salt.....	400	400	400
Somaliland (exports)—			
Sea-salt.....	2,613	1,485	935
South West Africa.....	4,942	3,762	4,048
Anglo-Egyptian Sudan.....	26,115	26,600	34,007
Kenya.....	3,750	(a)	(a)
Tanganyika Territory.....	6,807	8,439	8,585
Uganda.....	1,565	3,351	3,084
Union of South Africa (b).....	85,883	96,358	(a)
Canada.....	319,844	349,873	409,426
British West Indies (exports)—			
Sea-salt—			
Bahamas.....	536	.....	4,924
Turks and Caicos Islands.....	28,348	41,237	50,030
Aden.....	339,667	355,394	355,166
Burma.....	40,086	32,272	53,813
Ceylon.....	40,955	39,696	38,202
Cyprus (estimated).....	3,000	3,000	3,000
India—			
Rock-salt.....	178,352	172,255	187,100
Other salt.....	1,390,068	1,175,967	1,305,921
Palestine—			
Rock-salt.....	853	743	716
Sea-salt.....	10,212	7,931	11,532
Australia—			
Victoria (b).....	47,592	(a)	(a)
Western Australia.....	(a)	4,227	3,670
South Australia.....	78,003	66,326	73,558
Total*.....	5,300,000	5,300,000	5,800,000
Total foreign countries*.....	26,000,000	27,000,000	29,000,000
World's Total.....	31,000,000	32,000,000	35,000,000

* Salt is also produced in many countries for which statistics are not available, e.g., Gold Coast, Spain, Bolivia, Siam.

(a) Information not available.

(b) Years ended June 30.

TALC AND SOAPSTONE INDUSTRY

The value of crude and refined talc and soapstone sold by Canadian producers of these minerals in 1937 totalled \$163,814 compared with a corresponding value of \$177,270 in 1936 and \$171,532 in 1935. Production of soapstone during 1937 came entirely from the Eastern Townships of the province of Quebec while the output of talc represented shipments of the mineral made from deposits occurring near Madoc, Hastings county, Ontario. During recent years a relatively small tonnage of talc was shipped from a property operated at Anderson Lake in the Lillooet mining district of British Columbia, however, no talc mining operations were reported in this province during the year under review.

Shipments of talc and soapstone ranging from 50 tons to 1,420 tons were made from Canadian deposits during the period 1886 to 1906. Prior to 1900 the production consisted mainly of impure talc and soapstone shipped from Quebec.

It was not until 1900 that mining operations were commenced on the high grade talc deposits of the Madoc district. Ground talc was shipped from this district in 1906. Production advanced in value during the ensuing years until in 1927 the all-time high record output of \$236,105 was attained for these minerals.

Although it is known that early settlers made use of soapstone from deposits in Quebec for lining fireplaces and ovens and for footwarmers, the first official records of the mining of soapstone are for 1871 when 300 tons valued at \$1,000 were shipped from a deposit in Bolton township, Brome county.

The talc of the Madoc area is of foliated type, has a good white colour, and occurs as a series of vertical veins or bands in white crystalline dolomite. Near Broughton, in Quebec, crude lump talc, from a band cutting the soapstone body, and soapstone waste are shipped to a Montreal grinding plant. In addition to its use as a furnace material, Quebec soapstone is utilized in the manufacture of stoves, mantels, interior trim, ornaments, crayons, etc. The Bureau of Mines, Ottawa, reports that a recent development, which may seriously affect the demand for soapstone for pulp-mill use, is the introduction of a new type of water cooled alkali-recovery furnace; this is of steel construction, only the base being built of soapstone blocks; the Bureau of Mines also announced that in 1937 further work was reported on a talc deposit in Potton township, Broome county, Quebec, and in Ontario that surface prospecting was stated to have disclosed a large talc body in Cashel township, Hastings county. A deposit of soapstone, consisting of veins of pyralloite (altered pyroxene) in crystalline limestone, was worked during the year in Pakenham township, Lanark county, Ontario, the material being considered suitable for the production of turned or carved ornamental shapes.

During the latter part of 1937 the properties of Geo. H. Gillespie & Co. Ltd., and Henderson Mines Ltd., both located in the Madoc area, Hastings county, Ontario, were sold to the Canada Talc Ltd.

Little of importance in connection with new or improved industrial outlets for talc was recorded during the year. The paint, rubber, roofing and paper trades continue to take the bulk of the output. A considerable tonnage of Canadian talc is stated to be used also as a textile filler. Interest continues to develop in ceramic uses for talc, and research has shown it to have value in whiteware bodies, electrical porcelain, saggars, etc.

According to the Bureau of Mines, Ottawa, pyrophyllite, a hydrous silicate of alumina, closely resembling talc in appearance and certain physical properties, but of less common occurrence, is becoming industrially important for many of the same uses as talc: it does not flux when fired, however, as does talc, and has been shown to have value for the manufacture of high-grade, refractory ceramic products and cements. The only recorded occurrence of the mineral in Canada appears to be at Kyuquot Sound on the west coast of Vancouver Island; some work was done on the deposit around 1910.

Canadian talc prices remained unchanged from the previous year, at \$17.50 per ton for superfine grade, \$11.50 for No. 1 grade, and \$9.00 for No. 2 grade, all f.o.b. Madoc mills. Superfine, imported Italian talc, cosmetic grade, sold at \$80 to \$100 per ton, eastern points. American talcs were quoted at the end of the year as follows: Georgia white, \$8 per ton; grey, \$6; New York tremolite, fibrous, \$12 to \$15; Vermont grey, \$9 to \$9.50, all f.o.b. mills.

Canadian imports of talc or soapstone, ground or underground, in 1937 totalled 3,183 short tons valued at \$48,079 compared with 2,936 short tons at \$43,185 in 1936; of the 1937 imports, 2,812 short tons came from the United States. Exports of Canadian talc during 1937 totalled 8,698 short tons valued at \$85,953 against 10,222 tons at \$102,071 in the preceding year; the greater part of these exports went to the United States.

The annual statistical survey of the industry, as conducted by the Bureau of Statistics, determined 7 firms as active in 1937 and of these, 4 were located in Quebec and 3 in Ontario. Capital employed in the entire industry during the year amounted to \$625,497; employees totalled 83 and salaries and wages distributed aggregated \$72,020. The cost of fuel and purchased electricity used in 1937 totalled \$19,318 while the value of explosives and other process supplies consumed was reported at \$6,076. The net value of sales was estimated at \$138,420 compared with \$143,878 in 1936 and \$134,121 in 1935.

Trade agreements between Canada and the United States and between the United Kingdom and the United States were signed at Washington on Thursday, November 17, 1938. The following statement, prepared by the United States Tariff Commission, shows the former and new rates of duty on talc in schedule II (United States concessions to Canada), and the total imports of talc into the United States and the imports from Canada, according to preliminary United States statistics for the year 1937:—Talc, steatite, or soapstone, ground, etc., (except toilet preparations), valued at not more than \$14 per ton (1936 agreement covered talc valued at not more than \$12.50 per ton): rate of duty under Tariff Act of 1930, 35 per cent, under 1935 agreement, 25 per cent, under new agreement, 17½ per cent. Total value of all 1937 talc imports, was \$102,015 (a); value of 1937 talc imported from Canada was only \$52,484 (a)

(a) Includes only talc, etc., valued at not more than \$12.50 per ton.

Table 298.—Production (Sales) in Canada, Imports and Exports of Talc and Soapstone, 1936 and 1937

	1936		1937	
	Quantity	Value	Quantity	Value
		\$		\$
PRODUCTION—				
Soapstone (Quebec).....		32,770		40,513
Talc—Ontario.....	14,461	143,701	12,457	123,301
British Columbia.....	47	799		
Total Canada.....		177,270		163,814
IMPORTS—				
Talc or soapstone, ground or underground—				
From—United Kingdom.....	0.50	40		
United States.....	2,548	32,063	2,812	38,660
Italy and Other Countries.....	387	11,082	371	9,419
Total imports.....	2,936	43,185	3,183	48,079
EXPORTS—				
Talc to—United Kingdom.....	1,368	12,957	1,200	10,858
United States.....	8,742	87,907	7,453	74,686
Other Countries.....	112	1,207	45	409
Total Exports.....	10,222	102,071	8,698	85,953

Table 299.—Production of Talc and Soapstone in Canada, 1928-1937

Year	Value	Year	Value
	\$		\$
1928.....	219,358	1933.....	190,836
1929.....	229,198	1934.....	180,777
1930.....	186,216	1935.....	171,532
1931.....	157,083	1936.....	177,270
1932.....	159,038	1937.....	163,814

Table 300.—Consumption of Talc in Canada, by Industries, as reported in the Annual Census of Manufactures, 1935-1937

Industry	1935		1936		1937	
	Short tons	Cost at works	Short tons	Cost at works	Short tons	Cost at works
		\$		\$		\$
Rubber Industry.....		(a)		(a)	607	11,449
Electrical Apparatus.....	166	4,297	191	4,926	209	5,256
Paints.....	1,811	45,654	1,948	47,378	2,063	50,394
Soaps and Cleaning Preparations.....	139	2,583	128	2,680	151	3,123
Toilet Preparations.....	504	29,250	397	22,393	401	18,976
Polishes.....	1	32	10	222	16	330
Products from Imported Clays.....		(a)		(a)	110	1,460
Prepared Roofing.....	1,363	16,034	1,839	21,500	2,696	25,194
Pulp and Paper.....	1,361	24,652	1,124	22,497	865	16,385

(a) Not recorded.

It is interesting to note that the United States Bureau of Mines reported that—"Tiled bathrooms were largely responsible for the large increase in 1937 in the sale of talc, pyrophyllite, and ground soapstone, which were greater than ever before. Leading uses for many years were in paint, paper, rubber, and roll roofing, in about the order named, but notwithstanding the competition from many other kinds of wall-covering materials, the demand for more bathrooms, far greater than the demand for more homes, due to the vogue of two or more bathrooms per housing unit, coupled with the redesigning of ceramic mixtures so as to include talc, replacing flint and to some extent feldspar, has boosted ceramic uses already into third place."

Table 301.—Principal Statistics of the Talc and Soapstone Industry in Canada, 1935-1937

	1935	1936	1937
Number of firms.....	8	7	7
Capital employed..... \$	639,501	647,929	† 625,497
Number of employees—On salary.....	12	15	(a) 11
On wages.....	82	70	72
Total.....	94	85	83
Salaries and Wages—Salaries..... \$	25,662	26,526	20,474
Wages..... \$	44,141	44,409	51,546
Total.....	69,803	70,935	72,020
Selling value of products (Gross)..... \$	171,532	177,270	163,814
Cost of fuel and purchased electricity..... \$	23,774	21,669	19,318
Cost of explosives and other process supplies..... \$	13,637	11,723	6,076
Selling value of products (net)..... \$	134,121	143,878	138,420

(a) Includes two females. †Three in Ontario and four in Quebec—one firm only producing in Ontario.

Table 302.—Capital Employed in the Talc and Soapstone Industry in Canada, 1937

	\$
CAPITAL EMPLOYED AS REPRESENTED BY—	
(a) Present cash value of the land (excluding minerals).....	500
(b) Present value of buildings, fixtures, machinery, tools and other equipment.....	510,396
(c) Inventory value of materials on hand, ore in process, fuel and miscellaneous supplies on hand.....	3,514
(d) Inventory value of finished products on hand.....	12,737
(e) Operating capital (cash, bills and accounts receivable, prepaid expenses, etc.).....	98,350
Total.....	625,497

Table 303.—Wage-Earners, by Months, 1936 and 1937

Month	1936	1937			
	Total	Surface	Under-ground	Mill	Total
January.....	53	12	29	17	58
February.....	61	12	27	18	57
March.....	54	12	26	18	56
April.....	72	33	23	17	73
May.....	77	21	18	19	58
June.....	63	19	24	17	60
July.....	79	42	19	17	78
August.....	83	42	17	18	77
September.....	84	54	18	22	94
October.....	79	52	17	23	92
November.....	70	45	17	16	78
December.....	61	38	11	17	66

Table 304.—World Production of Talc, 1935-1937

(Imperial Institute)

(Long tons)

Producing Country	1935	1936	1937	Producing Country	1935	1936	1937
BRITISH EMPIRE				FOREIGN COUNTRIES—Con.			
Union of South Africa.....	299	406	370	Greece.....	543	850	1,809
Canada (sales) (b).....	12,324	12,954	11,122	Italy.....	41,614	43,226	44,987
India.....	12,596	9,968	13,040	Norway.....	27,343	25,827	28,998
Australia.....	1,442	1,502	1,494	Roumania.....	1,967	2,489	1,945
FOREIGN COUNTRIES				Sweden.....	5,967	7,033	7,812
Austria.....	30,254 (c)	30,000 (c)	25,000 (c)	Egypt.....	360	345	2,230
Bulgaria.....	15			Morocco (French) (exports)	709	1,346	828
Finland.....	2,150	1,656 (a)		United States (sales).....	154,211	193,028	205,356
France.....	58,600	50,700	55,400	Argentina.....	173	174	(a)
Germany (Bavaria).....	3,900	5,009	7,667	Uruguay (exports).....	1,181	704	297
				French Indo-China.....	170	670	421
				"Manchoukuo" (exports)...	73,665	81,785	109,384

Talc is also produced in U.S.S.R., Spain and China.

(a) Information not available.

(b) Excluding soapstone, which is only recorded by value and was as follows:—

1935.....	£6,500
1936.....	£6,600
1937.....	£8,200

(c) Estimated.

MISCELLANEOUS INDUSTRIAL OR NON-METAL MINING INDUSTRIES

Included in this chapter are the following non-metallic minerals and mineral products:—

Barite	Grindstones	Silica Brick
Bituminous Sands	Lithium Minerals	Sodium Carbonate
Diatomite	Magnesitic Dolomite	Sodium Sulphate
Fluorspar	Magnesium Sulphate	Strontium Minerals
Garnet	Natural Mineral Waters	Sulphur (Pyrites)
Graphite	Phosphate	

Canadian operators producing certain industrial minerals, and who are usually relatively few in number, have been segregated for statistical purposes into a single group designated as the Miscellaneous Non-Metal Mining Industry. Minerals or primary mineral products produced (or developed) by this industry during 1937 included: bituminous sands, diatomite, fluorspar, garnets, graphite, grindstones, lithium minerals, magnesian-dolomite (crude and refined), magnesium sulphate, mineral waters, phosphate, silica brick, sodium carbonate, and sodium sulphate. For convenience, the sulphur content of pyrites shipped and sulphur recovered from smelter gas, are recorded with the various miscellaneous minerals listed above; the value of sulphur production, however, is not included in the total for the miscellaneous non-metallic or industrial minerals as the value of this element is credited to the copper-gold-silver mining and non-ferrous smelting industries. General statistics relative to production of peat are also included with those of the miscellaneous industrial minerals.

The total gross value of production by the industry under review amounted to \$1,687,317 in 1937 compared with \$1,593,002 in 1936. Increases in the value of shipments above those made in the preceding year were realized for all products except peat, grindstones, magnesian-dolomite, and phosphate.

BARITE

Barite production in Canada during past years came largely from deposits in Nova Scotia, Quebec and Ontario and in recent years more particularly from deposits in the Lake Ainslie district, Nova Scotia. The last commercial shipments from Canadian deposits were made in 1933 in which year 20 tons valued at \$60 were produced and shipped at the Tionaga mine, Penhorwood township, Ontario. The mineral also occurs in British Columbia. For production in preceding years see Chapter I.

Ground barite is used as a heavy, white, inert filler in many products, such as paint, paper, rubber, oilcloth, linoleum, plastics, resins, and cloth. It is also used in the manufacture of glass and as a heavy medium in mud in the drilling of deep oil wells where high gas pressures are encountered. The most important single chemical product made from barite is lithopone, an intimate mixture of zinc sulphide and barium sulphate prepared by co-precipitation by double decomposition of solutions of barium sulphide and zinc sulphate; its chief use is as a white pigment.

According to the United States Bureau of Mines, crude barite, both domestic and foreign, used in the United States in the manufacture of barium products in 1937 totalled 383,982 short tons of which 148,930 tons were utilized in the manufacture of ground barite, 162,681 tons for lithopone, and 72,371 tons for barium chemicals. Crude barite is a relatively low price commodity; the average annual value of sales in the United States in the past forty years has ranged from about \$2 to \$10 per ton.

Table 305.—Barite and Blanc Fixe used by the Canadian Paints, Pigments and Varnishes Industry in Canada, 1931-1937

Year	Barite		Blanc Fixe(*)	
	Pounds	\$	Pounds	\$
1931.....	2,304,119	39,361	146,025	12,915
1932.....	2,064,303	35,138	23,353	817
1933.....	2,062,957	33,578	47,793	1,471
1934.....	2,393,330	44,690	93,918	2,481
1935.....	2,308,628	43,702	141,975	4,223
1936.....	2,533,275	41,687	97,016	3,148
1937.....	2,630,366	42,821	125,743	4,136

(*) Artificial barium sulphate.

Table 306.—Imports of Blanc Fixe, Lithopone and Barytes into Canada, 1932-1937

Year	Lithopone		Barytes		Blanc Fixe	
	Tons	Value	Pounds	Value	Pounds	Value
		\$		\$		\$
1932.....	8,055	585,148	2,583,400	22,989	932,168	20,932
1933.....	5,694	406,598	3,174,700	28,255	552,801	11,390
1934.....	7,265	510,558	3,113,800	26,937	968,201	21,638
1935.....	8,692	620,615	4,278,400	33,739	1,139,106	25,759
1936.....	9,429	666,667	3,316,000	26,554	1,064,032	21,480
1937.....	11,081	777,752	4,156,600	32,869	1,079,399	21,454

† 2,637,700 pounds from Germany, 852,700 pounds from the United States and 492,900 pounds from the United Kingdom.

Table 307.—World Production of Barium Minerals, 1935-1937

(Imperial Institute, London)

(Long tons)

Producing Country and Description	1935	1936	1937	Producing Country and Description	1935	1936	1937
BRITISH EMPIRE				FOREIGN COUNTRIES—Con.			
United Kingdom—				Germany—			
Barytes, unground.....	41,881	37,250	36,875	Baden.....	12,248	17,519	21,311
Witherite, unground.....	9,409	8,751	11,882	Bavaria.....	6,961	10,999	11,645
Barytes—				Prussia.....	321,786	385,910	404,149
Ground, bleached.....	6,288	5,731	5,427	Saxony.....	218	460	425
Ground, unbleached.....	20,554	21,338	19,124	Thuringia.....	545	443	6,683
Union of South Africa.....	556	574	561	Wurtemberg.....	(a)	1,000	189
India.....	5,493	5,114	15,689	Greece.....	22,726	30,841	38,722
Australia.....	2,544	2,157	3,103	Italy.....	40,502	36,092	44,488
FOREIGN COUNTRIES				Norway.....		402	69
Austria.....	784	1,637	841	Portugal.....		10	99
France.....	16,600	21,850	19,550	Egypt.....	84	30	50
				Cuba.....		(b) 256	3,788
				United States.....	194,710	244,698	322,212
				French Indo-China.....		39	44
				Japan.....		3,776	(a)
				Korea.....	10,853	5,032	(a)

Barytes is also produced in Czechoslovakia, Spain, China and U.S.S.R.

(a) Information not available.

(b) Exports.

BITUMINOUS SANDS

Commercial production of bituminous sands in Canada is confined to the province of Alberta. Large deposits of the material occur along the Athabaska river in the northern part of the province. Output during 1937 totalled 35 tons valued at \$142.

During 1937 the International Bitumen Company processed a small amount of bituminous sand at its plant at Bitumont, Alberta, with production of fuel oils and asphalt. Abasand Oils Limited continued construction work on separation, distillation and refining units on Horse river near McMurray.

The Department of Mines and Resources, Ottawa, has conducted a comprehensive investigation of these deposits of natural asphalt. Various industrial applications for the separated bitumen, as for example, in the manufacture of paints and varnishes and in the manufacture of certain rubber goods, are also being investigated. Results obtained have directed attention to the extent and potential economic importance of the deposits. Products that may be derived include motor fuels and other liquid hydrocarbons as well as certain solid and semi-solid bitumens.

Table 308.—Production of Bituminous in Canada, 1928-1937, (*)

Year	Tons	Value	Year	Tons	Value
		\$			\$
1928.....	94	374	1933.....	466	1,662
1929.....	989	3,956	1934.....	862	3,449
1930.....	2,067	8,268	1935.....	40	160
1931.....	1,015	4,060	1936.....		
1932.....	343	1,372	1937.....	35	142

(*) Production came entirely from the province of Alberta.

The total value of petroleum, asphalt and their products imported into Canada during 1937 amounted to \$59,012,412 compared with \$49,727,188 in 1936. Of the 1937 imports, those from the United States were appraised at \$47,570,783. Included in the imports of these materials during the year under review, were:—166,732 cwt. of asphalt valued at \$184,175; 67,837 gallons of asphaltum oil valued at \$4,099 for paving purposes, and 1,386,384,223 gallons of various crude petroleums and fuel oils valued at \$47,427,735.

DIATOMITE

Canadian production of diatomite in 1937 totalled 643 short tons valued at \$18,606 compared with 615 tons at \$13,650 in 1936. The greater part of the output of the material in 1937, as in former years, came from deposits located near Tatamagouche, Nova Scotia. Production in Ontario in 1937 came from the Muskoka area while the output credited to British Columbia represented shipments made from the Cariboo area.

A report issued by the Bureau of Mines, Ottawa, states: "Approximately 80 per cent of the diatomite now being consumed in Canada is in the form of filter-pads, about 15 per cent is used for insulation and the remainder is absorbed as a filler, concrete admixture, silver polish base, and in chemicals. Amongst the recent applications, the use of diatomite in the paint and varnish industry has demonstrated its advantages as a flattening agent and as an extender. Deposits containing medium quality diatomite are very common in some parts of Canada. Owing, however, to foreign competition and to the, at present, comparatively small Canadian demand, only the properly prepared diatomite of the highest quality can now be successfully marketed on a scale sufficiently large to warrant the operations of a property and the erection of a plant. The present price in Canada varies from \$35 to \$40 per ton for concrete admixture; \$35 to \$75 for insulation and filtration; up to \$200 in small lots of material suitable for polishes; imported insulation bricks vary from \$85 to \$140 per 1,000, according to grade and density."

Imports into Canada during 1937 of diatomaceous earth or infusorial earth (Kieselguhr), ground or unground, totalled 4,394,000 pounds valued at \$63,917 compared with 5,703,100 pounds at \$78,687 in 1936. Imports during 1937 came entirely from the United States.

Table 309.—Production of Diatomite in Canada, 1928-1937

Year	Tons	Value	Year	Tons	Value
		\$			\$
1928.....	368	8,960	1933.....	1,789	36,648
1929.....	429	10,330	1934.....	1,372	54,912
1930.....	554	13,247	1935.....	823	33,140
1931.....	1,610	32,789	1936.....	615	13,650
1932.....	1,496	29,509	1937.....	643	18,606

Table 310.—Consumption of Infusorial Earth by the Canadian Sugar Refining Industry, 1932-1937

Year	Pounds	Value	Year	Pounds	Value
		\$			\$
1932.....	2,577,585	73,309	1935.....	4,307,142	96,560
1933.....	2,507,469	70,191	1936.....	4,375,999	98,954
1934.....	2,562,552	69,116	1937.....	4,586,786	95,532

Table 311.—World's Production of Diatomaceous Earth, 1935-1937.

(Supplied by the Imperial Institute)

(Long tons)

Producing Country	1935	1936	1937
BRITISH EMPIRE			
Great Britain.....		1,086	1,141
Northern Ireland.....	4,893	7,466	7,168
Canada.....	735	549	574
Barbados.....	10	10	10
Australia.....	3,014	2,778	3,190
Union of South Africa.....	169	96	148
FOREIGN COUNTRIES			
Bulgaria.....		62	138
Denmark (moler).....	47,200	61,000	80,000
Estonia (exports).....			100
Finland.....	984	1,378	1,771
France.....	7,150	9,600	10,600
Germany (d).....	5,827	6,112	7,407
Hungary (exports).....	1,376	1,197	2,105
Italy.....	3,007	3,701	4,586
Norway (exports).....	140	229	106
Portugal.....	4,413	64	109
Roumania (c).....	3,080	(a)	(a)
Sweden.....	1,207	1,095	1,736
U.S.S.R.....	1,269	(a)	(a)
Algeria.....	11,200	11,922	12,759
United States.....	(b)	(a)	(a)
Chile.....	12	40	(a)
Korea.....	3,440	742	2,480
Netherlands East Indies.....	88	124	39

Diatomaceous earth is also produced in Spain and Japan.

(a) Information not available.

(b) Annual average production for years 1933 to 1935.

(c) Converted from cubic metres at the rate of 1 cubic metre=2 long tons.

(d) Production of Hessen only.

FLUORSPAR

Fluorspar production in Canada during 1937 totalled 150 short tons valued at \$2,550 compared with 75 tons at \$900 in 1936. Production of the mineral in Canada since 1929 has been confined to the Madoc area, Hastings county, Ontario. Fluorspar was formerly produced at the Rock Candy mine, in British Columbia, by the Consolidated Mining and Smelting Company of Canada, Limited; production in 1929 from this mine totalled 17,800 short tons valued at \$267,000. Following the erection of a large fertilizer plant at Trail, the recovery of by-product fluorine from phosphate rock has obviated the necessity of employing fluorspar as a source of fluorine by the Consolidated Mining and Smelting Company of Canada, Ltd. According to the Bureau of Mines, Ottawa, the whole of such recovery is consumed in the lead refinery, but the company is considering other outlets, such as, in the manufacture of sodium fluosilicate, used in the ceramic and glass industries, for laundry purposes, and as an insecticide; lead and zinc fluosilicates, also of value as grasshopper poisons; and ammonia fluosilicate, used as a detergent.

Commercial fluorspar is usually graded according to the following specifications: acid grade, lump or ground, 98 per cent CaF_2 , not over 1 per cent SiO_2 ; glass and enamel grade, ground 95 per cent CaF_2 , not more than 3 per cent SiO_2 and 0.1 per cent Fe_2O_3 ; fluxing gravel or lump grade 85 per cent CaF_2 , not more than 5 per cent SiO_2 . By far the largest use of fluorspar is in the metallurgical industries, chiefly as a flux in the production of basic open-hearth steel (fluxing gravel grade). Consumption, in short tons, of fluorspar by United States industries in 1937 was as follows: Basic open hearth steel, 138,900; electric furnace steel, 7,500; foundry, 2,500; ferro-alloys, 1,200; hydrofluoric acid and derivatives, 24,100; enamel and vitrolite, 5,900; glass, 11,600; miscellaneous, 2,600.

Fluorspar prices in the United States were reported in November, 1938, as follows: per net ton, 85 per cent CaF_2 , and not over 5 per cent SiO_2 , Kentucky and Illinois, in bulk, f.o.b. mines, washed gravel, \$18, for all rail movement. Ground fluorspar, f.o.b. Illinois mines, 95 to 98 per cent CaF_2 and not over $2\frac{1}{2}$ per cent SiO_2 , \$30 in bulk. Foreign fluorspar, gravel, 85-5, \$22.50 per gross ton, duty paid, Baltimore or Philadelphia.

Table 312.—Production of Fluorspar in Canada, 1928-1937

Year	Short tons	Value	Year	Short tons	Value
		\$			\$
1928.....			1933.....	73	1,064
1929.....	(a) 17,870	268,120	1934.....	150	2,100
1930.....	80	1,240	1935.....	75	900
1931.....	40	620	1936.....	75	900
1932.....	32	464	1937.....	150	2,550

(a) 17,800 tons valued at \$267,000 produced in British Columbia; production since 1929 entirely from Ontario mines.

Imports of fluorspar into Canada during 1937 totalled 11,444 short tons valued at \$168,082 compared with 11,194 short tons at \$95,268 in 1936. Of the 1937 imports, 1,790 short tons valued at \$11,402 came from the United Kingdom, 4,058 short tons at \$77,606 from the United States, and 2,638 short tons at \$35,493 from Newfoundland.

Table 313.(†)—Fluorspar Shipped from Mines in the United States, by Uses, 1937

(United States Bureau of Mines)

Industry	Short tons	Average value per ton
		\$
Steel.....	137,040	18.51
Foundry.....	47,264	18.42
Glass.....	340,187	26.79
Enamel and vitrolite.....	166,186	27.45
Hydrofluoric acid and derivatives.....	481,544	26.93
Miscellaneous.....	86,283	19.01

(†) Subject to revision.

Table 314.—Consumption of Fluorspar in Canada, by Uses, as Reported to the Annual Census of Industry

Industries	1936		1937	
	Quantity	Cost at works	Quantity	Cost at works
	Tons	\$	Tons	\$
Steel furnaces.....	7,942	88,403	9,083	143,558
Chemicals (acids, alkalies and salts).....	3,502	46,402	3,503	52,035
Glass.....	71	2,360	91	3,008
Ferro-alloys.....	10	174	19	376
Enamelling and glazing.....	160	(a)	130	(a)
Total accounted for.....	11,685		12,826	

(a) Not available.

Table 315.—World Production of Fluorspar, 1935-1937

(Imperial Institute, London)

(Long tons)

Producing Country	1935	1936	1937
BRITISH EMPIRE			
United Kingdom.....	31,146	32,962	42,160
Union of South Africa.....	1,949	3,074	3,558
Canada.....	67	67	134
Australia.....	685	816	1,442
Newfoundland.....	4,000	10,424	12,000
FOREIGN COUNTRIES			
France.....	22,400	30,100	50,650
Germany—			
Anhalt.....	7,941	11,048	13,446
Baden.....	3,879	7,242	13,422
Bavaria.....	30,783	48,377	61,469
Prussia.....	24,229	35,698	30,032
Saxony.....	6,828	7,864	7,946
Thuringia.....	23,200	18,495	15,862
Italy.....	8,291	11,256	13,174
Norway.....	1,050	998	1,665
U.S.S.R.....	48,300	64,000	(a)
Tunis.....			1,676
Mexico (estimated).....	1,000	1,000	1,000
United States.....	91,000	150,000	163,000
Argentina.....	397	443	(a)
Korea.....	9,568	8,602	(b) 15,500

Fluorspar is also produced in Spain and China.

(a) Information not available.

(b) Exports.

GARNETS

No commercial production of garnets has been reported in Canada for several years. In 1937 the Damigo Mining Syndicate, Toronto, conducted mining operations on a garnet deposit in Ashby township some 20 miles east of Bancroft, Ontario, and 5 tons of garnet rock were shipped to the Industrial Minerals Laboratories of the Bureau of Mines, Ottawa, for concentration tests. The Canada Garnet Company in 1937 acquired the assets of the Labelle Mining, Inc., in Joly township, near Labelle, Quebec, installing mining equipment and beginning the erection of a concentrator at the close of the year. A small amount of garnet rock was shipped for testing to the Bureau of Mines laboratories, Ottawa, by the International Garnet Syndicate, Montreal, from its property which adjoins that of the Canada Garnet Company.

Garnet is employed chiefly in the manufacture of abrasive papers and cloths while small amounts are utilized in the grinding of plate glass and other products.

No imports of garnets, described as such, were recorded in Canada during 1936 or 1937; the mineral, however, may enter in the form of abrasive paper or combined with other abrasive imports, n.o.p. It has been reported that approximately 175 tons of graded garnet grains are imported annually into Canada.

Engineering and Mining Journal's "Metal and Mineral Markets"—New York—November, 1938, quotations for garnet were—per ton, f.o.b. New Hampshire mines: concentrate, \$30; grain, \$80 to \$140. New York: Adirondack garnet concentrates, \$85. Spanish grades, \$60, c.i.f. port of entry. Nominal.

GRAPHITE

Canadian mine production of graphite during 1937 was valued at \$125,343 compared with \$88,812 in 1936. The output in 1937 came solely from the Black Donald mine, Renfrew county, Ontario. Relatively small and intermittent shipments of graphite were also made from Quebec properties prior to 1935.

Although the Black Donald graphite flakes are too small to be suitable for crucible use, the products made are well adapted for lubricants and foundry facings. In recent years, the highest grade has been successfully employed in pencil manufacture.

Flake and crystalline (plumbago) grades are obtained mainly from Madagascar and Ceylon, respectively, countries that can lay down graphite on the North American continent at prices that render domestic production difficult. American supplies of amorphous graphite are derived mainly from Mexico and Chosen (Korea). Artificial graphite, made in the electric furnace, is now being used more and more extensively in dry battery manufacture and is also employed in liquid lubricants and electrodes.

"Canadian Chemistry and Metallurgy"—Toronto—quotation for graphite, October, 1938, was—various grades, 100 pound lots—per pound, 15 cents to 40 cents. "Metal and Mineral Markets"—New York—1938 quotations for graphite were—per pound, f.o.b. New York. Ceylon lump, $6\frac{3}{4}$ to $7\frac{1}{4}$ cents; carbon lump, $5\frac{3}{4}$ to $6\frac{1}{2}$ cents; chip, 5 to $5\frac{3}{4}$ cents; dust, 3 to 4 cents; Madagascar flake, $5\frac{1}{2}$ to 7 cents. No. 1 flake, $9\frac{1}{2}$ to 17 cents; No. 2, 7 cents upwards. Crude amorphous graphite, f.o.b. New York, \$12 to \$23 per ton, according to grade.

The United States Bureau of Mines, in its Foreign Minerals quarterly, states that "Graphite in Madagascar occurs in the crystalline schists and graphitic gneiss in lenticular masses and disseminated in the schists. Mining is confined to underground workings; the one is hand sorted and crushed and treated in a flotation plant which produces a high-grade concentrate; production in 1937 totalled 12,390 metric tons compared with 7,360 tons in 1936.

Table 316.—Production of Graphite in Canada, by Provinces, 1928-1937

Year	Quebec		Ontario		Canada	
	Quantity	Value	Quantity	Value	Quantity	Value
	Tons	\$	Tons	\$	Tons	\$
1928.....	50	4,668	1,047	52,373	1,097	57,041
1929.....	173	12,652	1,288	90,522	1,461	103,174
1930.....	197	9,850	1,338	86,542	1,535	96,392
1931.....			548	32,149	548	32,149
1932.....			346	18,483	346	18,483
1933.....	43	2,222	362	16,145	405	18,367
1934.....	129	6,426	1,389	64,998	1,518	71,424
1935.....	21	1,281	1,761	78,500	1,782	79,781
1936.....				88,812		88,812
1937.....				125,343		125,343

Table 317.—Canadian Imports and Exports of Graphite, 1935-1937

	1935		1936		1937	
	Quantity	Value	Quantity	Value	Quantity	Value
	Tons	\$	Tons	\$	Tons	\$
IMPORTS—						
Crucibles, plumbago.....		38,066		38,559		62,433
Plumbago, not ground or otherwise manufactured.....		6,559		5,166		9,545
Plumbago, ground, and manufactures of, n.o.p.....		92,852		88,188		105,188
EXPORTS—						
Graphite or plumbago, crude or refined....	3,548	145,772	3,384	138,454	2,948	133,262
Carbon and graphite electrodes.....		488,188		657,361		721,727

Table 318.—Consumption of Graphite or Plumbago in Canada, by Industries, as Reported to the Census of Industry, 1936-1937

Industry	1936		1937	
	Quantity	Cost at works	Quantity	Cost at works
	Short tons	\$	Short tons	\$
Paints and varnishes.....	59	5,023	48	4,112
Polishes.....	55	5,796	54	5,769
Foundries.....	127	18,004	159	19,788
Acids and salts(*).....	35	11,132	58	17,192
Prepared foundry facings.....	156	6,746	157	7,120
Total accounted for.....	432	46,701	476	53,981

(*) In addition, electrodes valued at \$301,378 were used in 1937.

Table 319.—World Production of Graphite, 1935-1937

(Imperial Institute, London)

(Long tons)

Producing Country	1935	1936	1937
BRITISH EMPIRE			
Union of South Africa.....	65	58	61
Canada (sales).....	1,591	(b)	(b)
Ceylon (exports).....	13,908	13,515	17,381
India.....	557	388	558
Australia.....	44	23	14
FOREIGN COUNTRIES			
Austria (crude).....	19,182	21,367	17,871
Czechoslovakia.....	1,840	2,880	5,063
Germany (crude).....	21,321	23,906	23,172
Italy.....	5,072	5,118	5,326
Norway.....	2,305	2,338	2,695
Sweden.....	68	62	25
U.S.S.R.....	82,400	(a)	(a)
Madagascar.....	9,621	7,280	(c) 12,192
Morocco (French).....		400	331
Argentina.....		18	(a)
Mexico.....	6,866	10,092	11,032
Brazil.....	(a)	(a)	8
Japan.....	1,182	1,551	(a)
Korea—Flake.....	4,167	5,757	(c) 42,881
Other.....	39,368	34,511	

NOTE.—Graphite is also produced in the United States.

(a) Information not available.

(b) Recorded by value only { 1936.....£17,859

{ 1937.....£25,373

(c) Exports.

GRINDSTONES AND PULPSTONES

Most of the grindstones produced in 1937 came from near Stonehaven on the Bay of Chaleur, New Brunswick, and a few from Quarry Island, Pictou county, Nova Scotia; stones produced were made up from material quarried in previous years. Production of grindstones in Canada during the year totalled 251 tons valued at \$12,407.

Output of pulpstones in 1937 totalled 87 short tons valued at \$4,875; the entire production of these stones originated in a quarry situated on the northeast end of Gabriola Island, near Nanaimo, Vancouver Island, British Columbia.

Scythstones were produced in 1937 only by the Read Stone Company, Stonehaven, New Brunswick, and by G. A. Smith of Shediac in the same province; production of these stones during the year under review totalled 74 tons valued at \$4,147.

Canadian grindstones are valued at \$50 per ton and pulpstones at \$57 per ton at the quarries. The Bureau of Mines, Ottawa, reports that there is a demand for good pulpstones, particularly for use in the large magazine grinders, but as deposits containing thick beds of the proper quality sandstone are very scarce in Canada, only about 1 per cent of the stones used in Canadian pulp mills is being produced in the Dominion. The artificial pulpstones made of silicon carbide segments and also more recently of fused alumina segments are gradually but surely replacing the natural stone.

Imports into Canada of grinding stones or blocks, manufactured by the bonding together of either natural or artificial abrasives, totalled \$16,353 in 1937. Imports in 1937 of grinding wheels, manufactured by the bonding together of either natural or artificial abrasives, amounted to \$106,232. Imports of grindstones in 1937, not mounted, and not less than 36 inches in diameter, numbered 1,587 and were valued at \$157,699 while imports of grindstones, n.o.p., in 1937 totalled 7,133 at \$11,306.

Table 320.—Production of Grindstones, Pulpstones and Scythestones in Canada, 1928-1937

Year	Tons	\$	Year	Tons	\$
1928.....	1,855	100,960	1933.....	498	21,919
1929.....	1,947	106,354	1934.....	987	46,478
1930.....	830	62,021	1935.....	708	34,010
1931.....	621	38,103	1936.....	569	24,724
1932.....	328	15,735	1937.....	412	21,429

Table 321.—Production of Natural Abrasive Stones, by Kinds, 1937

	Pulpstones		Sharpening Stones		Grindstones	
	Tons	\$	Tons	\$	Tons	\$
Nova Scotia.....			29	4,012	8	403
New Brunswick.....			45 *	135	243	12,004
British Columbia.....	87	4,875				
Canada.....	87	4,875	74	4,147	251	12,407

(*) Crude blocks for export.

Table 322.—Consumption of Pulpstones by the Canadian Pulp and Paper Industry, 1931-1937

Year	Number for 2 ft. wood	Value	Number for 2·5 ft. wood	Value	Number for 4 ft. wood	Value
		\$		\$		\$
1931.....	226	72,588	225	71,760	285	337,580
1932.....	210	65,450	139	46,436	222	249,373
1933.....	321	98,475	95	31,945	199	223,635
1934.....	378	103,811	84	29,680	268	292,359
1935.....	417	116,501	52	20,297	237	243,805
1936.....	463	120,227	61	19,478	253	281,265
1937.....	392	123,598	84	21,700	280	382,084

The Artificial Abrasives and Abrasive Products Industry

The value of all products made by the artificial abrasives manufacturers in Canada during 1937 was 33 per cent greater than in 1936 and higher than in any other year on record. The gross factory value for the industry was \$14,174,351 in 1937 compared with \$10,631,533 in 1936, \$13,851,785 in 1935, and \$8,961,951 in 1929.

Sixteen establishments made artificial abrasives and abrasive products in 1937, 15 being in Ontario and 1 in Quebec. The average number of employees was 1,289 and payments in salaries and wages totalled \$1,995,589. Expenditures for manufacturing materials amounted to \$4,351,854, and \$1,222,529 was paid out for fuel and electricity. Capital employed totalled \$7,151,369 of which \$3,416,068 represented the present value of plants and equipment.

Table 323.—Artificial Abrasives Manufactured, 1936 and 1937

Product	1936		1937	
	Short tons	Selling value at works	Short tons	Selling value at works
		\$		\$
Crude silicon carbide.....	23,805	2,299,602	25,644	2,808,016
Crude fused alumina.....	59,533	5,762,217	86,604	8,435,371
Silicon carbide firesand, etc.....	2,411	38,800	703	11,192
Abrasive wheels and segments.....		862,283		1,165,406
Sharpening stones and files.....		89,524		95,317
Ferrosilicon.....	6,935	81,295	7,396	94,824
Other products(*).....		1,497,812		1,564,225
Total.....		10,631,533		14,174,351

(*) Includes abrasive cloth, abrasive paper, tiles, artificial pulpstones, artificial graphite, boron carbide, boron carbide shapes, calcium boride, fused magnesia, refractory cements, firebrick, etc., each of which was reported by only one or two companies.

Table 324.—Materials Used in Manufacturing Artificial Abrasives, 1936 and 1937

Materials	1936		1937	
	Quantity	Cost at works	Quantity	Cost at works
	Tons	\$	Tons	\$
Bauxite and pure alumina.....	67,681	1,493,571	102,843	2,200,551
Coal (not for fuel)—For fused alumina.....	770	4,138	1,140	5,928
For silicon carbide.....	7,459	44,708	6,416	38,519
Coke (not for fuel)—For fused alumina.....	3,333	17,568	5,910	30,416
For silicon carbide.....	24,745	332,010	25,734	345,241
Electrodes.....	1,064	134,605	1,580	203,155
Feldspar.....	36	999	53	1,503
Iron borings.....	5,987	49,089	10,025	107,827
Salt.....	337	2,671	38	2,786
Sawdust.....	8,845	28,096	9,277	26,431
Silica sand.....	44,455	217,499	45,240	211,899
Artificial abrasive grains.....	2,667	310,355	2,364	406,479
Natural abrasive grains—Garnets.....	101	17,849	164	28,951
Other.....	114	6,538	200	12,956
Bonding and bushing materials—				
(a) Clay bonds.....	265	17,038	370	22,511
(b) Elastic mixture.....	9	4,264	26	9,846
(c) Bakelite and synthetic resins.....	33	24,563	54	37,926
(d) Lead for bushings.....	25	3,087	35	4,655
Cotton cloth.....		91,329		103,599
Kraft and rope paper.....		6,381		119,223
Containers, boxes, packages, etc.....		25,992		46,063
All other materials.....		331,902		385,389
Total.....		3,164,252		4,351,854

Table 325.—Imports into Canada and Exports of Abrasives, 1936 and 1937

	1936		1937	
	Quantity	Value	Quantity	Value
		\$		\$
IMPORTS				
Artificial abrasive grains, crushed or ground for use in Canadian manu- factures.....		520,655		699,020
Diamond dust or bort and black diamond for borers.....		2,429,480		4,630,037
Diatomaceous earth or infusorial earth (Kieselguhr), ground or un- ground.....Cwt.	57,031	78,687	43,940	63,917
Emery in bulk, crushed or ground.....		43,535		60,030
Grinding wheels, manufactured by the bonding together of either natural or artificial abrasives.....		85,545		106,232
Grinding stones or blocks, manufactured by the bonding together of either natural or artificial abrasives.....		7,339		16,353
Manufactures of emery or of artificial abrasives, not otherwise pro- vided for.....		55,305		62,864
Grindstones, not mounted, and not less than 36 inches in diameter. No. Cwt.	1,013	122,028	1,587	157,699
Grindstones, not otherwise provided for.....No.	5,180	6,968	7,133	11,306
Pumice and pumice stone, lava and calcareous tufts, not further manu- factured than ground.....		21,275		26,238
Sand paper, glass, flint and emery paper and emery cloth.....		85,398		80,521
Total.....		3,456,215		5,914,217
EXPORTS				
Abrasives, natural, n.o.p., in ore or bulk, crushed or ground, including infusorial earth, rotten stone, tripoli, etc.....Cwt.	9,561	15,200	8,422	13,153
Abrasives, artificial, crude, including carborundum.....Cwt.	1,703,721	5,132,041	2,258,435	6,544,454
Abrasives, artificial, made up into wheels, stones, etc.....		129,431		141,214
Grindstones, manufactured.....		1,688		135
Total.....		5,278,360		6,698,956

LITHIUM MINERALS

Commercial production of Canadian lithium minerals was first recorded in 1937. Shipments were made by the Lithium Corporation of Canada, Limited, from deposits located at Bernic Lake, near Pointe du Bois, Eastern Manitoba. The Material was valued at \$1,694 and was consigned to a United States chemical plant. The Bureau of Mines, Ottawa, reports that the present supply of lithium minerals is drawn from deposits in the United States, Southwest Africa, and France. The newly discovered spodumene deposit in North Carolina are regarded as one of the world's largest potential sources of supply of lithium. The principal commercial lithium ores are amblygonite, a fluophosphate of lithium and aluminium; spodumene, a silicate of these two elements; and lepidolite or lithia mica, also a silicate. All of the above minerals occur in Canada, but there has, as yet, been only a small production, mainly of lepidolite and spodumene; the important deposits are all in Manitoba.

The Minerals Yearbook of the United States Bureau of Mines states that research indicates a possible large demand for spodumene in tableware as it imparts desirable properties when employed in both body and glaze. Lepidolite has been used principally in glass making. Amblygonite is the most readily decomposed mineral for making lithium salts but the United States Bureau of Mines laboratories have worked out methods that promise to reduce the cost of making salts from spodumene. Average values in 1937, f.o.b. United States mines, were \$37.63 per ton for amblygonite and \$25 for spodumene. Lepidolite was quoted nominally at \$20 to \$25 a ton.

Statistics relating to possible imports of lithium minerals or chemicals into Canada are not published separately.

MAGNESITIC DOLOMITE

Production of magnesitic dolomite (calcined) in Canada during 1937 was valued at \$677,207 compared with the all-time high record of \$768,742 in 1936.

Magnesitic-dolomite production in Canada, as an industry, is confined to Grenville and Harrington townships, Argenteuil county, Quebec. Deposits of the rock were discovered here in 1900 but it was not until 1907 that these were developed. The cutting off of the Austrian supply of magnesite during the world war greatly stimulated investigations of the Ottawa Valley deposits as a Canadian source of magnesite for the manufacture of refractory brick and furnace lining.

Important developments in the magnesitic dolomite industry during 1937 included the change-over from open pit quarrying to underground mining by Canadian Refractories Limited, and also the installation of a modern high-temperature tunnel kiln by the same company for the making of basic brick.

Competing with magnesite as sources of magnesia products are dolomite, brucite and sea water. Interest in magnesite deposits has been greatly stimulated by the world-wide demand for magnesium metal as magnesite is now an important source of this light metal. A deposit of Precambrian dolomite containing crystals of brucite and pyroaurite disseminated through it has recently been found near Mattawa, Ontario. Brucite (hydrated magnesium oxide) is also found in small quantity as an alteration product of serpentine in the asbestos producing districts of Quebec.

Table 326.—Production of Magnesitic-Dolomite (Calcined) in Canada, 1928-1937

Year	Value	Year	Value
	\$		\$
1928.....	346,990	1933.....	360,128
1929.....	491,170	1934.....	382,927
1930.....	336,162	1935.....	486,084
1931.....	295,579	1936.....	768,742
1932.....	262,860	1937.....	677,207

Table 327.—Imports and Exports of Magnesite and Products, 1935-1937

	1935		1936		1937	
	Quantity	Value	Quantity	Value	Quantity	Value
	Tons	\$	Tons	\$	Tons	\$
IMPORTS—						
Magnesia pipe covering.....		37,523		33,451		63,546
Magnesite (crude rock).....	(cwt. 1)		20	1,271	0.5	64
Magnesite firebrick.....		384,141		568,565		653,507
Magnesite, dead-burned, sintered, caustic-calcined or plastic magnesia.....	765	42,644	1,163	56,515	1,019	55,360
Magnesium carbonate excepting crude rock and that used for rubber manufacture.....	549	49,556	507	48,521	487	48,002
Magnesia (magnesium oxide).....	138	28,304	186	40,182	135	30,868
Magnesite calcined, for the manufacture of insulating materials.....	(a)	(a)	(a)	(a)	411	15,407
EXPORTS—						
Magnesite, calcined or dead-burned.....	1,577	43,338	2,928	71,183	2,028	49,401

(a) This item recorded only from April 1937.

Table 328.—Magnesite and Dolomite used in the Manufacture of Artificial Abrasives, Abrasive Products and Iron and Steel and their Products in Canada, 1931-1937

Year	Abrasives		Iron and steel			
	Magnesite*		Dolomite		Magnesite	
	Short tons	Value	Short tons	Value	Short tons	Value
1931.....	(a)	\$ (a)	15,773	\$ 76,317	(a)	\$ (a)
1932.....	(a)	(a)	6,725	32,523	420	14,500
1933.....	(a)	16,430	6,874	30,557	399	14,798
1934.....	104	6,370	14,748	69,104	2,733	105,072
1935.....	40	2,448	18,394	79,914	3,891	149,987
1936.....	418	25,256	43,562	145,502	6,432	230,656
1937.....	484	29,242	53,066	181,146	8,994	326,091

(a) Information not available.

NOTE.—In addition to dolomite and magnesite the Canadian steel industry consumes large quantities of firebrick.

* Calcined.

Canadian Trade Journal quotation for calcined magnesite (October, 1938) was \$48 to \$60 per ton. "Metal and Mineral Markets"—New York—November, 1938, quotations for magnesite were—per ton, f.o.b. California: dead burned, \$25. Artificial periclase, 94 per cent MgO, \$65; 90 per cent, \$35. Caustic, 95 per cent MgO, white color, \$40; 85 per cent MgO, no color standard, \$37.50. Washington: dead burned grain magnesite, \$22.

Table 329.—World Production of Magnesite, 1935-1937

(Imperial Institute, London)

(Liong tons)

	1935	1936	1937		1935	1936	1937
BRITISH EMPIRE				FOREIGN COUNTRIES—Conc.			
Union of South Africa—				Greece—Crude.....	92,085	114,272	159,123
Crude.....	1,462	1,667	1,724	Caustic (c).....	18,807	22,762	44,548
Canada—Crude.....	26,684	(d)	(d)	Dead-burnt (c)....	6,162	6,552	5,464
India—Crude.....	16,984	15,468	26,166	Italy—Crude.....	1,231	3,105	5,307
Australia—Crude.....	16,068	17,615	19,705	Calcined (c).....	653		
FOREIGN COUNTRIES				Norway—Crude.....	2,436	3,067	2,063
Austria—Crude.....	295,569	391,494	(a)	Calcined (c).....	603	544	601
Caustic (c).....	43,042	57,621	(a)	Bricks (c).....	787	607	587
Dead-burnt (c)....	93,029	97,025	(a)	Yugoslavia (Serbia only)—			
Bricks (c).....	38,172	42,015	(a)	Crude.....	29,256	38,392	40,531
Czechoslovakia—Crude (b).	9,317	8,545	12,010	Calcined.....	11,475	13,910	19,464
Calcined.....				United States—			
Germany (Prussia)—Crude.	28,763	34,957	37,465	Crude.....	158,173	184,928	181,640
	13,600	14,789	20,758	Caustic sales (c)....	5,401	7,141	8,956
				Dead-burnt (sales) (c)...	64,677	80,338	74,289
				Korea—Crude.....	2,372	14,033	(a)
				"Manchoukuo"—Crude.....	154,000	203,000	(a)
				Turkey—Crude.....	1,075	2,247	316

Magnesite is also produced in the U.S.S.R.

(a) Information not available.

(b) Exports less imports.

(c) Derived from crude shown and not additional.

(d) Production recorded by value only—1936..... £154,583 1937..... £137,086.

MAGNESIUM SULPHATE (EPSOM SALTS—NATURAL)

Producers' shipments of natural magnesium sulphate or Epsom salts in Canada totalled 727 short tons valued at \$14,456 in 1937 compared with 654 tons at \$13,712 in 1936. Production in both years represented recoveries made from a deposit of the mineral occurring at Basque, British Columbia. Epsom Refineries Limited, the company operating this deposit, has remodelled and enlarged its plant at Ashcroft, British Columbia, the productive capacity being approximately 10 tons per day. Its product is marketed, principally, in the tanning and medicinal industries; the company was reorganized in 1938 under the name Ashcroft Salt Co. Ltd.

Table 330.—Production of Natural Magnesium Sulphate in Canada (*), 1933-1937

Year	Tons	Value	Year	Tons	Value
		\$			\$
1933.....	120	3,360	1936.....	654	13,712
1934.....	42	1,100	1937.....	727	14,456
1935.....	340	7,965			

(*) Produced entirely in British Columbia.

Table 331.—Magnesium Sulphate used in Canadian Pharmaceutical Preparations and in Tanning, 1932-1937

Year	Pharmaceutical preparations		Tanning(*)	
	Pounds	Value	Pounds	Value
		\$		\$
1932.....	622,459	28,073	181,811	2,418
1933.....	851,355	24,629	396,424	4,467
1934.....	816,830	33,793	228,281	4,789
1935.....	826,082	22,647	759,744	12,254
1936.....	878,120	23,162	1,115,965	15,120
1937.....	919,825	23,881	992,203	16,165

(*) Data not entirely complete for years prior to 1935.

Table 332.—Imports into Canada of Magnesium Sulphate (Epsom Salts), 1931-1937

Year	Pounds	Value	Year	Pounds	Value
		\$			\$
1931.....	4,120,086	43,807	1935.....	3,684,390	40,407
1932.....	4,383,115	47,679	1936.....	3,579,069	37,928
1933.....	4,269,852	49,868	1937.....	*3,355,147	33,116
1934.....	4,599,518	48,459			

(*) 2,553,069 pounds valued at \$17,030 from Germany and 693,204 pounds at \$14,058 from the United States.

Canadian trade publications quoted (October, 1938) magnesium sulphate, B.P. bbls. 2½ to 3 cents per pound. Technical, bags, \$35 to \$40 per ton.

MINERAL WATERS

Shipments of natural mineral waters from Canadian springs totalled 225,019 imperial gallons valued at \$20,586 in 1937 compared with 154,286 imperial gallons worth \$18,516 in the preceding year. Production during both years originated in Ontario and Quebec. Some of the more prominent Canadian mineral waters possessing special therapeutic or hygienic properties include the following: in Quebec, the Abenakis springs on the St. François river in Yamaska county; Potton Springs in Brome county and the Coulombia spring at L'Epiphanie. In Ontario, saline, sulphur and gas springs occur at Caledonia Springs and at Carlsbad Springs, near Ottawa; the waters range from alkaline to strongly saline. St. Catharines, near Niagara, is one of the oldest Canadian mineral water resorts and sulphur waters are found at the Preston mineral springs in Waterloo county. The most famous of all Canadian springs is undoubtedly the group of hot sulphur springs at Banff, Alberta. In British Columbia the Harrison Hot Springs in the Fraser Valley and the Halcyon Hot springs on Arrow Lake are noted for their curative properties.

The total number of firms reporting production of natural mineral waters in the Dominion totalled 19 in 1937, of which 16 were located in the province of Quebec and 3 in Ontario.

It is interesting to note that natural mineral waters from springs in the county of Lac St. Jean, Quebec, were utilized during both 1936 and 1937 in highway maintenance.

Table 333.—Shipments of Natural Mineral Waters from Canadian Springs, 1930-1937

	Quebec		Ontario		Canada	
	Imp. gal.	\$	Imp. gal.	\$	Imp. gal.	\$
1930.....	12,941	3,727	214,200	20,754	227,141	24,481
1931.....	19,868	4,746	197,540	8,578	217,408	13,324
1932.....	15,506	4,697	61,208	2,473	76,714	7,170
1933.....	9,024	3,094	29,794	2,347	38,818	5,441
1934.....	75,665	16,116	21,775	1,622	97,440	17,738
1935.....	126,616	15,113	19,900	1,477	146,516	16,590
1936.....	131,186	17,399	23,100	1,117	154,286	18,516
1937.....	198,319	19,697	26,700	889	225,019	20,586

Imports into Canada of natural mineral waters, not in bottles, totalled 60 imperial gallons valued at \$37 in 1937 compared with 55 gallons worth \$22 in 1936. Mineral and aerated waters, n.o.p., imported during 1937 were valued at \$88,607 against \$89,505 in the preceding year.

Exports of mineral and aerated waters during 1937 were valued at \$5,097 while in 1936 similar exports amounted to \$4,057.

PHOSPHATE

Production of phosphate in 1937 amounted to only 100 tons valued at \$900. The mineral during the year under review was obtained entirely from deposits located in the Hull-Buckingham district of the province of Quebec and was utilized in the manufacture of chemicals.

The Department of Mines and Resources, Ottawa, reports that the only important recorded occurrences of phosphate rock in Canada are the Precambrian apatite deposits of the Ottawa-Kingston region in Ontario and Quebec, and the rather low-grade sedimentary phosphate of the Crownest district just west of the boundary between southern Alberta and British Columbia.

The Quebec and Ontario apatite deposits were once of considerable importance and were actively mined as a source of fertilizer phosphate, but the industry became unprofitable upon the discovery of the immense sedimentary phosphate deposits of the Southern United States about 1890. Enormous tonnages of apatite are now being produced by concentration from low-grade ores of the Murmansk region in Russia.

Although fertilizers will always continue to consume the great bulk of the world's phosphate produced, a growing future for phosphorus and its compounds appears to be assured. One of such chemicals that is rapidly coming into extensive use is tri-sodium phosphate, employed as a detergent in laundry work and as a general cleanser, as well as for preventing scale or scum in boiler-feed and washing waters, and in the tanning, photographic, sugar, and other industries.

Table 334.—Production of Phosphate in Canada, by Provinces, 1929-1937

Year	Quebec		Ontario		British Columbia		Canada	
	Quantity	Value	Quantity	Value	Quantity	Value	Quantity	Value
	Tons	\$	Tons	\$	Tons	\$	Tons	\$
1929.....	40	800	.....	.....	1,145	4,580	1,185	5,380
1930.....	40	760	.....	.....	.....	.....	40	760
1931.....	.....	.....	.....	.....	.....	.....	.....	.....
1932.....	1,316	12,333	.....	.....	.....	.....	1,316	12,333
1933.....	105	805	.....	.....	2,109	4,670	2,214	5,475
1934.....	81	683	.....	.....	.....	.....	81	683
1935.....	116	1,043	70	60	.....	.....	186	1,103
1936.....	525	4,927	.....	.....	.....	.....	525	4,927
1937.....	100	900	.....	.....	.....	.....	100	900

Table 335.—Imports of Phosphate and Phosphate Products, 1935-1937

	1935		1936		1937	
	Quantity	Value	Quantity	Value	Quantity	Value
	Tons	\$	Tons	\$	Tons	\$
IMPORTS—						
Phosphate rock.....	63,514	234,580	83,474	298,179	113,970	453,599
Acid phosphate (not medicinal).....	397	55,449	219	28,462	202	23,186
Phosphorus and compounds, n.o.p.....	55	36,549	35	22,762	46	28,370
Superphosphate or acid phosphate of lime.....	75,250	661,792	96,067	867,666	100,726	952,775
Soda phosphate.....	1,870	124,328	1,082	77,961	679	55,198

Table 336.—Phosphate Rock and Superphosphate used in the Manufacture of Canadian Fertilizers, 1931-1937

Year	Superphosphate		Phosphate Rock	
	Short tons	\$	Short tons	\$
1931.....	51,639	595,789	48,373	395,547
1932.....	36,005	366,462	41,114	316,518
1933.....	59,443	657,123	21,961	164,614
1934.....	73,182	839,980	48,007	396,133
1935.....	86,701	986,674	74,507	610,118
1936.....	97,515	1,103,222	60,924	438,948
1937.....	137,801	1,661,243	101,704	726,572

"Metal and Mineral Markets"—New York—November, 1938—phosphate quotations—were—per long ton, f.o.b. mines: Florida pebble, domestic, 77 to 76 per cent; \$4.35; 70 per cent, \$2.35. Tennessee, ground lime phosphate, 85 per cent, through 300 mesh, 34.30 per cent P_2O_5 , \$7.25 per short ton, bags extra.

Table 337.—World Production of Phosphate Rock, 1935-1937

(Imperial Institute, London)

(Long tons)

Producing Country	1935	1936	1937
BRITISH EMPIRE			
Tanganyika.....	191		102
Seychelles (exports).....	9,923	23,564	9,442
Canada.....	166	469	89
India.....	102	125	166
Christmas Island.....	147,929	161,440	162,568
Australia.....	235	175	20
Nauru Island.....	480,950	547,400	688,900
Ocean Island.....	228,100	403,100	398,800
Total.....	868,000	1,136,000	1,260,000
FOREIGN COUNTRIES			
Belgium (b).....	15,531	15,836	
Estonia.....	11,458	11,228	9,952
France.....	49,300	54,100	101,747
Germany.....	177	1,043	3,262
Poland.....	11,457	12,300	(a)
Roumania (e).....	2,740	(a)	(a)
U.S.S.R. (d).....	1,800,000	2,178,900	(a)
Algeria.....	594,326	523,000	621,180
Egypt.....	466,411	522,644	508,837
Madagascar.....	6,000	5,250	(a)
Morocco (French).....	1,134,117	1,314,087	1,455,156
Tunis.....	1,470,000	1,464,000	1,757,100
Netherlands West Indies (exports).....	89,276	76,897	100,229
United States.....	3,159,328	3,462,837	4,261,416
Formosa.....		210	(a)
French Indo-China.....	(f) 5,795	9,200	21,800
China (estimated).....	8,000	8,000	8,000
Japan.....	89,807	111,315	(a)
Netherlands East Indies.....	11,371	11,238	25,754
Philippine Islands.....	1,169	444	(a)
Angaur Island (exports).....	76,878	87,817	89,220
French Oceania.....	133,800	145,000	160,000
New Caledonia.....	9,000	4,800	
Total.....	9,100,000	10,000,000	(a)
World's Total.....	10,000,000	11,100,000	(a)

(a) Information not available.

(b) In addition phosphatic chalk was produced as follows:—

1935.....	62,979 long tons
1936.....	58,737 "
1937.....	51,444 "

(d) Figures refer to concentrates of apatite and phosphate-rock plus the ground phosphate used directly as a fertilizer. The production of phosphate-rock before concentration was:—

	1935	1936
Apatite.....	1,530,700	(a)
Other phosphate-rock.....	1,722,700	1,764,400

(e) Converted from cubic metres at the rate of 1 cubic metre=2 long tons.

(f) Amount ground.

POTASH

Natural potash salts are not yet mined or recovered on a commercial scale in Canada. Potash occurs in small quantities in rock salt strata at Malagash, Cumberland county, Nova Scotia, and at Gautreau, Westmorland county, New Brunswick. A search for beds of economic importance has been made and results so far obtained have been sufficiently promising to warrant future work. Potassium chloride so far opened up at Malagash occurs in a number of definite bands in the salt mass in the form of crystalline beds of pink and yellowish green sylvite in the matrix of halite. Small shipments of potash-bearing salt have been made from the Malagash deposit; this salt was employed as a fertilizer.

The principal world producers of potash minerals are Germany, France, Russia, the United States and Poland. About 93 per cent of the potash consumed in the United States in 1937 was used in the manufacture of fertilizers and 7 per cent in the chemical industries. The chief sources of potash production in the United States were the natural brines of Searles Lake, Trona, California, where muriate of potash, borax, soda ash, and salt cake are recovered and the bedded saline deposits near Carlsbad, New Mexico.

Imports into Canada of crude muriate of potash, as a fertilizer, totalled 824,907 cwt. valued at \$1,006,842 during 1937, while those of crude sulphate of potash, for the same purpose, amounted to 110,025 cwt. valued at \$155,390. The total value of saltpetre and all other potassium compounds imported in 1937 was \$379,576.

Table 338.—Potash Salts Used in the Manufacture of Canadian Fertilizers, 1936 and 1937

	1936		1937	
	Tons	Cost at works	Tons	Cost at works
		\$		\$
Kainite and potash manure salts.....	833	9,569	75	2,500
Muriate of potash.....	17,251	442,249	28,899	795,733
Sulphate of potash.....	2,551	88,854	3,925	142,312
Nitrate of potash.....	25	1,299	624	32,421

Table 339.—Sales of Potash Salts for Fertilizer Purposes, Other than for Manufacture of Mixed Fertilizers, Years ended June 30, 1936 and 1937

	1936	1937
	Tons	Tons
Muriate of potash.....	7,619	8,713
Sulphate of potash.....	492	476

PYRITES (Sulphur)

The sulphur content of pyrites shipped and sulphur recovered from non-ferrous smelter gas (SO₂) amounted in 1937 to 130,913 short tons valued at \$1,154,992 compared with 122,132 short tons valued at \$1,033,055 in 1936. Production in both years came from the provinces of Quebec, Ontario and British Columbia. The production figures for 1937 represent an all-time high record in the output of sulphur by the Canadian mining and smelting industries. Sulphur output in Canada during the first six months of 1937 totalled 58,930 short tons compared with 62,055 tons in the corresponding period of 1937.

No iron pyrites deposits, known as such, have been mined in Canada for some years and statistics published regarding recent pyrites production refer to by-product iron pyrites recovered in the mining and concentrating of copper-gold-silver ores.

Sulphur employed in the manufacture of sulphuric acid during 1937 was recovered from salvaged smelter gas in Ontario and British Columbia. In Ontario, Canadian Industries Limited continued the operation of its acid plant at Copper Cliff, using sulphur dioxide obtained from the smelter of the International Nickel Company, while in British Columbia the Consolidated Mining and Smelting Company of Canada, Limited, manufactured sulphuric acid and other chemical products at Trail, using the by-product gases of its metallurgical plants. During 1937 an increase of 18 tons capacity per day was being installed in the ammonia plant at Trail and further increases in the sulphur, sulphuric acid, and absorption plants were actually being built or under design that would enable the company to treat all of the smelter gases for the recovery of sulphur dioxide.

In 1937, by-product pyrites was produced at the Eustis and Aldermac mines in Quebec and at the Britannia mine in British Columbia. In April, 1938, the Aldermac Copper Corporation Limited, announced that in accordance with certain recommendations, the sulphur pilot plant had been shut down and designs and specifications for the erection of a commercial sulphur plant, estimated to produce 100 tons of sulphur per day, were being prepared; this plant when operating would consume 250 tons of pyrite per day out of the 500 tons being produced.

"Canadian Chemistry and Metallurgy"—Toronto—quoted sulphur (September, 1938)—crude, contracts f.o.b. cars at mines—long ton, \$18 to \$20. Crude, contracts, ex-vessel, St. Lawrence and Maritime ports, long ton, \$23.50 to \$25.50; roll, 100 pounds, \$3.50. "Metal and Mineral Markets"—New York—quoted pyrites (November, 1938)—per long ton unit of sulphur, c.i.f. United States ports, guaranteed 48 per cent sulphur, Spanish, 12 to 12½ cents nominal. Sulphur, per long ton, for United States markets, \$16, f.o.b. Texas mines.

Sulphur contained in pyrites exported from Canada during 1937 totalled 46,317 tons valued at \$251,834 of which 12,434 tons went to the United States and 30,383 tons to Japan.

Table 340.—Production of Pyrites† in Canada, 1928-1937

Year	Pyrites	Sulphur content	Value	Year	Pyrites	Sulphur content	Value
	Tons	Tons	\$		Tons	Tons	\$
1928.....	68,836	38,589	321,033	1933.....		57,373	510,299
1929.....		42,781	350,843	1934.....		51,537	515,502
1930.....		37,730	314,835	1935.....		67,446	634,235
1931.....		50,107	429,457	1936.....		122,132	1,033,055
1932.....		53,172	470,014	1937.....		130,913	1,154,992

†Includes sulphur content of pyrites at its sales value and estimated figures for quantity and value of sulphur in smelter gases used for acid making and also elemental sulphur produced at Trail, B.C., since 1933.

Table 341.—Production in Canada of Pyrites with Sulphur Content, including Sulphur Contained in Sulphuric Acid, Etc., made from Smelter Gases, 1936-1937

	Pyrites(*)			Smelter Gas		Total Sulphur	
	Sales	Sulphur content		Sulphur content		Tons	Value
	Tons	Tons	Value	Tons	Value		
1936			\$		\$		\$
Quebec.....	86,919	43,084	282,743			43,084	282,743
Ontario.....				14,152	141,520	14,152	141,520
British Columbia (a).....	40,293	20,084	160,672	(b) 44,812	448,120	64,896	608,792
Canada.....	127,212	63,168	443,415	58,964	589,640	122,132	1,033,055
1937							
Quebec.....	56,760	28,534	194,496			28,534	194,496
Ontario.....				14,009	140,090	14,009	140,090
British Columbia.....	62,698	31,647	253,176	(b) 56,723	567,230	88,370	820,406
Canada.....	119,458	60,181	447,672	70,732	707,320	130,913	1,154,992

(*) Recovered from copper ores.

(a) In addition, iron pyrites ore was shipped for smelting purposes.

(b) Includes elemental sulphur and sulphur in sulphuric acid and direct ammonium sulphate.

Table 342.—Imports into Canada of Brimstone and Sulphur, 1931-1937

Year	Cwt.	\$	Year	Cwt.	\$
1931.....	2,483,842	2,281,654	1935.....	2,733,499	2,297,650
1932.....	2,099,895	2,023,085	1936.....	3,375,484	2,802,282
1933.....	2,816,202	2,529,920	1937.....	(a)4,513,683	3,669,082
1934.....	3,153,943	2,589,311			

(a) 4,511,961 cwt. from the United States.

Table 342.(a)—Consumption of Sulphur by Specified Canadian Industries, 1935-1937

Industry	1935		1936		1937	
	Tons	\$	Tons	\$	Tons	\$
Wood-pulp.....	126,958	2,960,761	143,317	3,310,932	165,559	3,827,991
Petroleum refining.....	78	5,098	66	4,631	80	6,776
Acids, alkalis and salts.....	14,301	295,336	11,738	222,053	21,329	403,511
Matches.....	32	1,507	28	1,344	63	3,043
Explosives.....	1,576	41,098	1,902	49,427	2,377	62,075
Insecticides.....	845	29,821	1,038	42,920	1,023	35,077
Adhesives.....	67	2,187	59	1,963	70	2,336
Chemicals, miscellaneous.....	6	231	7	259	32	994
Rubber.....	1,134	47,464	1,190	51,059	1,393	60,370
Sugar.....	154	7,986	179	8,568	157	7,104
Fruit and vegetable preparations.....	26	2,131	38	3,054	33	2,343
Other industries (*).....	190	6,947	193	6,235	224	7,895

(*) Starch and glucose, dyeing and finishing of textiles.

Table 343.—World Production of Pyrites, 1935-1937

(including Cupreous Pyrites)

(Imperial Institute, London)

Long tons

Producing Country	1935	1936	1937	Estimated Sulphur Content		
				1935	1936	1937
BRITISH EMPIRE						
United Kingdom.....	4,194	4,623	4,627	(a)	(a)	(a)
Southern Rhodesia.....	12,040	19,140	20,020	4,800	7,700	8,000
Union of South Africa.....	24,672	24,146	28,378	11,096	10,978	12,727
Canada(c).....	26,076	113,582	106,659	12,966	56,400	53,733
Cyprus.....	357,282	525,227	796,196	178,641	262,614	398,098
Australia.....	25,555	33,711	40,630	(a)	(a)	(a)
Total.....	450,000	720,000	997,000			
FOREIGN COUNTRIES						
Czechoslovakia.....	20,000	18,783	18,071	8,300	7,891	7,590
Finland (b).....	81,712	77,477	89,969	36,800	34,900	40,500
France.....	149,590	144,570	143,604	67,969	65,371	64,000
Germany.....	272,414	280,947	417,354	115,666	120,288	176,672
Greece.....	130,200	204,764	203,386	63,000	99,435	98,709
Italy.....	820,240	851,736	900,080	372,000	398,000	420,000
Norway.....	879,401	1,015,529	1,031,744	399,856	448,953	445,557
Poland.....	720	37,508	80,963	310	16,128	34,800
Portugal.....	211,362	238,791	594,590	100,000	112,000	279,500
Roumania.....	9,699	9,841	10,548	6,363	6,189	6,611
Spain.....	2,250,000	(a)	(a)	1,300,000	(a)	(a)
Sweden.....	105,128	132,086	170,236	42,398	56,114	74,147
Yugoslavia.....	82,218	78,494	131,922	37,000	36,500	59,400
U.S.S.R.....	609,000	(a)	(a)	(a)	(a)	(a)
Algeria.....	12,125	19,650	38,148	5,630	8,980	18,311
United States(d).....	514,192	547,236	584,166	203,047	216,592	231,800
Japan.....	1,317,745	1,665,891	(a)	58,000	750,000	(a)
Korea.....	54,733	76,804	(a)	(a)	(a)	(a)
"Manchoukuo".....	9,000	(a)	(a)	(a)	(a)	(a)
Total.....	7,600,000	(a)	(a)			
World's Total.....	8,000,000	(a)	(a)			

(a) Information not available.

(b) Pyrite concentrate only.

(c) Includes pyrite ore, also concentrates made from copper ores.

(d) Includes by-product pyrite from zinc operations in Wisconsin and New York, and pyrite and pyrrhotite concentrates from copper operations in Tennessee.

Pyrites is also produced in China.

SULPHURIC ACID

The output of sulphuric acid surpassed the previous record and reached a total of 282,716 tons of 68° Bé acid. Seven plants were operated by four companies, as follows: The Consolidated Mining and Smelting Company of Canada, Limited, at Trail, B.C.; Canadian Industries Limited at Copper Cliff, Ont., Hamilton, Ont., and New Westminster, B.C.; Nichols Chemical Company Limited at Sulphide, Ont., and Barnett, B.C.; and the Dominion Steel and Coal Corporation Limited at Sydney, N.S. The first two of these works, at Trail and at Copper Cliff, operated entirely on sulphur-bearing smelter gases. Most of the Trail output was used in the company's own fertilizer works and part of the Copper Cliff production was used to make nitre cake for use in the nickel-copper smelter of the International Nickel Company. Only 108 tons of sulphuric acid were imported during 1937 and 1,608 tons were exported.

Table 344.—Production, Imports, Exports and Apparent Consumption of Sulphuric Acid, 1928-1937

Years	Production	Imports	Exports	Apparent consumption (*)
		(Short tons)		
1928.....	96,227	55	13,329	82,953
1929.....	110,749	111	8,397	102,463
1930.....	107,352	150	571	106,931
1931.....	119,541	80	997	118,624
1932.....	136,846	62	712	136,196
1933.....	148,142	58	1,013	147,187
1934.....	205,325	82	953	204,454
1935.....	224,410	83	1,027	223,466
1936.....	241,075	108	1,128	240,055
1937.....	282,716	108	1,608	281,216

(*) No allowance made for changes in stocks on hand.

SILICA BRICK

The production of silica brick in Canada during 1937 totalled 3,744 M valued at \$181,126 compared with 2,393 M worth \$97,285 in 1936. The manufacture of these refractories was confined, in both years, to the plants of the Dominion Steel and Coal Company, Ltd., at Sydney, Nova Scotia, and the Algoma Steel Corporation Ltd., Sault Ste. Marie, Ontario. The brick manufactured by both of these companies are processed from crushed silica rock and are utilized in furnace construction and repairs. The quantity of silica brick produced in the Dominion in 1937 was surpassed only by the output in 1929, while the value of production in 1937 was the greatest ever recorded in Canadian silica brick production.

Table 345.—Production of Silica Brick in Canada, 1928-1937

Year	M	\$	Year	M	\$
1928.....	3,224	155,502	1933.....	636	23,185
1929.....	3,951	173,581	1934.....	2,528	85,945
1930.....	2,418	97,379	1935.....	2,461	96,194
1931.....	900	35,746	1936.....	2,393	97,284
1932.....	93	4,304	1937.....	3,744	181,126

Table 346.—Imports of Silica Brick (*) into Canada, 1931-1937

Year	\$	Year	\$
1931.....	234,909	1935.....	215,500
1932.....	122,952	1936.....	(a) 261,974
1933.....	147,901	1937.....	(b) 539,253
1934.....	210,190		

(*) Containing not less than 90 per cent silica.

(a) \$261,952 from the United States.

(b) \$527,444 from the United States.

SODIUM CARBONATE (NATURAL)

Production of natural sodium carbonate in Canada during 1937 totalled 286 short tons valued at \$2,574 compared with 192 tons at \$1,677 in 1936. Deposits of this material in the form of "natron" (sodium carbonate with 10 molecules of water) and also as brine, occur in a number of "lakes" throughout the central part of the province of British Columbia, chiefly in the Clinton mining division, around 70 Mile House, and in the neighbourhood of Kamloops. Production in Canada during recent years has come entirely from deposits in British Columbia.

It was estimated that the consumption of soda ash (normal sodium carbonate) as sold to industries in the United States during 1937 was: glass manufacture, 38 per cent; chemicals, 31; soap, 8; modified sodas, 6; pulp and paper, 4; and water softening, textiles, petroleum refining, export and miscellaneous uses, 13.

Table 347.—Production of Sodium Carbonate (Natural) in Canada, 1928-1937

Year	Tons	\$	Year	Tons	\$
1928.....	519	4,922	1933.....	559	5,773
1929.....	600	8,100	1934.....	244	1,920
1930.....	364	4,550	1935.....	242	2,430
1931.....	712	7,351	1936.....	192	1,677
1932.....	495	5,450	1937.....	286	2,574

Table 348.—Imports of Bicarbonate of Soda and Soda Ash, 1931-1937

Years	Bicarbonate of soda		Soda ash or barilla	
	Pounds	\$	Pounds	\$
1931.....	10,931,335	188,268	1,647,304	25,771
1932.....	10,592,208	196,841	1,803,951	27,751
1933.....	11,716,431	211,065	1,616,483	23,256
1934.....	11,918,011	205,058	2,311,498	32,258
1935.....	12,009,724	207,325	2,647,572	37,995
1936.....	11,927,818	197,904	3,184,692	43,503
1937.....	12,835,249	199,011	†10,103,477	113,219

†10,101,867 pounds from the United States and 1,610 pounds from the United Kingdom.

Table 349.—Consumption of Soda Ash (Sodium Carbonate) in Specified Canadian Industries

Industry	Unit	1936		1937	
			\$		\$
Chemicals and allied products (a).....	pounds	27,352,622	424,729	29,511,323	430,657
Manufactures of non-metallic minerals (b).....	pounds	52,222,676	673,232	62,582,000	817,456
Pulp and paper.....	tons	2,692	93,418	2,696	91,989
Textiles (dyeing and finishing).....	pounds	339,812	5,922	324,247	5,827
Sugar refineries.....	pounds	173,203	4,095	190,320	4,134
Dyeing, cleaning and laundry work.....	pounds	617,432	16,343	795,312	25,534

(a) Includes acids, salts, explosives, soap, etc.

(b) Includes coke and gas, glass and petroleum refining.

SODIUM SULPHATE

(Glauber's Salt and Salt Cake)

Producers' shipments of natural sodium sulphate in Canada totalled 79,884 short tons valued at \$618,028 in 1937 compared with 75,598 tons at \$552,681 in 1936. The output during 1937, in both quantity and value, was the greatest ever recorded in the history of Canadian production of this mineral.

Sodium sulphate is recovered in Canada almost entirely in the province of Saskatchewan and is produced either as hydrated sodium sulphate, known as Glauber's salt, or anhydrous sodium sulphate, known to the trade as "salt cake." It occurs as crystals (Glauber's salt) or in the form

of partially saturated or saturated brines in many lakes throughout Western Canada. Some of the Saskatchewan properties are equipped with plants for the purification and dehydration of the crude salt. It is interesting to note that a relatively small commercial output of the mineral was recorded in the province of Alberta during 1937. The increased demand for sodium sulphate from the pulp mills and the nickel-copper smelting industry was largely responsible for the large increase in output of sodium sulphate in 1937.

According to the Bureau of Mines, Ottawa, the product from these western deposits should find a rapidly extending market, as the by-product material from the manufacture of hydrochloric acid is each year decreasing in volume owing to the manufacture of this acid synthetically.

During 1937, six firms—five in Saskatchewan and one in Alberta—reported production of natural sodium sulphate; capital employed in the industry was reported at \$912,841; fuel, purchased electricity and process supplies consumed totalled \$186,132, and \$153,181 were distributed as salaries and wages to the 122 employees.

"Canadian Chemistry and Metallurgy"—Toronto—(October, 1938)—quoted sodium sulphate (Glauber's salt), crystals, in bags, cwt., to \$1.25; carlots, \$22.00 to \$27.00 per ton; anhydrous, \$27.00 to \$35.00 per ton.

Table 350.—Production of Natural Sodium Sulphate (*) in Canada, 1928-1937

Year	Short tons	Value	Year	Short tons	Value
		\$			\$
1928.....	6,016	68,804	1933.....	50,080	485,416
1929.....	5,018	64,112	1934.....	66,821	587,986
1930.....	31,571	293,847	1935.....	44,817	343,764
1931.....	44,957	421,097	1936.....	75,598	552,681
1932.....	22,466	271,736	1937.....	79,804	617,548

(*) Produced in the province of Saskatchewan, with the exception of 80 tons valued at \$480 produced in Alberta during 1937.

Table 351.—Salt Cake Used in the Manufacture of Canadian Wood-Pulp and in the Acids, Alkalies and Salts Industry, 1932-1937

Year	Medicinal and pharmaceutical industry		Acids, alkalies† and salts industry		Wood-pulp	
	Tons	Value	Tons	Value	Tons	Value
		\$		\$		\$
1932.....			94	1,811	24,301	489,343
1933.....	39	4,879	9,968	146,201	29,563	580,251
1934.....	51	7,278	26,075	368,576	34,559	655,905
1935.....	59	4,617	22,485	316,734	35,350	642,801
1936.....	27	2,546	7,220	102,176	41,524	711,635
1937.....	29	2,234	8,006	113,054	50,584	884,437

†The 1932, 1936 and 1937 figures do not include sodium sulphate consumed direct in the smelting of nickel-copper ones.

Table 352.—Imports of Glauber's Salt and Salt Cake into Canada, 1931-1937

Year	Glauber's Salt		Salt Cake (Sulphate of Soda)	
	Pounds	\$	Pounds	\$
1931.....	1,999,042	10,838	17,321,652	97,215
1932.....	1,806,882	11,027	8,865,730	51,925
1933.....	1,791,011	13,237	5,191,036	34,371
1934.....	1,266,665	8,853	21,154,815	123,980
1935.....	3,167,715	26,591	10,352,070	49,354
1936.....	*2,510,103	27,521	(a)23,494,805	110,676
1937.....	†3,402,133	24,348	(b)28,234,278	132,352

*Of the 1936 imports, 2,037,970 pounds came from Germany, 248,716 pounds came from the United States and 80,784 pounds came from the United Kingdom.

(a) Of the 1936 imports, 9,202,877 pounds came from the United States and 14,291,928 pounds from the United Kingdom.

† Of the 1937 imports 3,307,638 pounds valued at \$21,882 came from Germany.

(b) Of the 1937 imports 17,755,034 pounds valued at \$78,168 came from the United States and 10,479,244 pounds at \$54,184 from the United Kingdom.

STRONTIUM MINERALS

Four celestite (Sr SO_4) deposits of economic interest occur in eastern Ontario but there has been no commercial production of the mineral in Canada for several years. A special report prepared by the Imperial Institute, London, refers to strontium minerals, as follows—"The reserves of strontium minerals, however, in both England and Germany appear to be limited, and it is possible that the known deposits in Canada, the United States, France, Tunis, and the U.S.S.R. will be opened up and exploited to an increasing extent in the future . . . Strontium minerals are used principally in the beet-sugar industry; in pyrotechnics; as fillers; as "cleansers" for removing sulphur and phosphorus from special steels; as precipitants in the purification of caustic soda; in the chemical, pharmaceutical and ceramic industries; and in certain refrigerators."

In 1936 the United Kingdom produced 5,771 long tons of celestite while during the same year, 258 long tons of strontianite were produced in Germany; celestite is also mined in France. Imports of strontium minerals into the United States in 1937 totalled 5,636,570 pounds valued at \$20,877; strontium nitrate, 609,488 pounds at \$40,240, and strontium carbonate and oxide, 44,579 pounds at \$4,610. No imports of strontium minerals into Canada were reported in either 1936 or 1937.

Strontianite was quoted by "Metal and Mineral Markets"—November, 1938—United States—per ton, lump, in carload lots, minimum 84 to 86 per cent SrCO_3 , \$55.

Table 353.—Production of Miscellaneous Non-Metallic Minerals in Canada, 1936 and 1937

Item	Unit of measure	1936		1937	
		Quantity	Value	Quantity	Value
			\$		\$
Bituminous sands.....	Ton			35	142
Diatomite(c).....	Ton	615	13,650	643	18,606
Fluorspar.....	Ton	75	900	150	2,550
Graphite.....	\$		88,812		125,343
Grindstones (b) (c).....	Ton	569	24,724	412	21,429
Lithium minerals.....	\$				1,694
Magnesium sulphate.....	Ton	654	13,712	727	14,456
Magnetitic-dolomite.....	\$		768,742		677,207
Mineral waters.....	Imp. gal.	154,286	18,516	225,019	20,586
Peat production.....	Ton	1,341	7,376	478	2,676
Phosphate(a).....	Ton	525	4,927	100	900
Silica brick.....	M	2,393	97,285	3,744	181,126
Sodium carbonate.....	Ton	192	1,677	286	2,574
Sodium sulphate.....	Ton	75,598	552,681	79,884	618,028
Total (Gross).....	\$		1,593,002		1,687,317
Sulphur production(*).....	Ton	122,132	1,033,055	130,913	1,154,992

(a) Represents apatite mined in Quebec.

(b) Includes pulpstones, etc.

(c) In preceding years included under the natural abrasives industry.

(*) Includes sulphur content of pyrites at its sales value and estimated figures for quantity and value of sulphur in smelter gases used for acid making or recovered as elemental sulphur, or in ammonium sulphate (direct). General statistics relating to production of sulphur are included with those of the copper-gold mining and non-ferrous smelting industries.

Table 354.—Principal Statistics Relating to Miscellaneous Non-Metal Mining Industries in Canada, 1936 and 1937 (a)

	1936	1937
Number of plants.....	41	53
Capital employed..... \$	2,195,621	3,050,376
Number of employees—On salary.....	76	78
On wages.....	401	452
Total.....	477	530
Salaries and wages—Salaries..... \$	106,761	143,820
Wages.....	419,487	514,903
Total..... \$	526,248	658,723
Selling value of products (gross)..... \$	1,554,628	1,687,317
Cost of fuel and electricity..... \$	296,017	321,919
Cost of process supplies used..... \$	252,427	228,953
Selling value of products (net)..... \$	1,006,184	1,136,445

(a) Statistics for 1936 and 1937 are not entirely comparable in that data relating to production of natural abrasives were included with "miscellaneous non-metallic minerals" for the first time in 1937.

Table 355.—Capital Employed in the Miscellaneous Non-Metal Mining Industries in Canada, 1937

	\$
CAPITAL EMPLOYED AS REPRESENTED BY:—	
(a) Present cash value of the land (excluding minerals).....	192,640
(b) Present value of buildings, fixtures, machinery, tools and other equipment.....	1,946,432
(c) Inventory value of materials on hand, ore in process, fuel and miscellaneous supplies on hand.....	176,246
(d) Inventory value of finished products on hand.....	312,737
(e) Operating capital (cash, bills and accounts receivable, prepaid expenses, etc.).....	422,312
Total	3,050,376

Table 356.—Wage-Earners, by Months, 1937

Month	Mine		Mill
	Surface	Under-ground	
January.....	105	77	138
February.....	96	77	162
March.....	98	78	167
April.....	123	76	197
May.....	213	41	193
June.....	266	50	239
July.....	259	45	258
August.....	236	45	238
September.....	211	61	248
October.....	221	65	205
November.....	208	62	242
December.....	118	58	208
Average	182	62	208

CHAPTER NINE

CLAY PRODUCTS AND OTHER STRUCTURAL MATERIALS

Including Cement, Clay and Clay Products (Brick, Drain Tile, Koalin, Sewer Pipe, Structural Tile, Stoneware and Pottery made from Domestic Clays, Fireclay, Firebrick, Fireclay Blocks and Shapes, Imported-Clay Products), Lime, Sand and Gravel, Sand-Lime Brick, and Stone, including Slate.

Grouped in this chapter are those industries producing structural materials of non-metallic composition. During the depression years, immediately following 1929, these important branches of the Canadian mineral industry suffered severe economic losses. Production declined and employment fell to a relatively low level. Shipments of cement, lime, stone, clay products, sand and gravel totalled \$58,534,834 in 1929; this high value was succeeded by unbroken annual decreases to \$16,696,683 in 1933, from which year recovery has been relatively slow, however, a distinct advance was realized in 1937 when the value of these materials aggregated \$34,869,699 or an increase of 35.31 per cent over the corresponding value of \$25,770,741 in the preceding year.

There has been an increasing consumption of stone and lime for other than building purposes. This has been particularly evident in recent years and is the result of expansion in certain industries where these materials are utilized in various chemical processes. Shipments of stone and lime for these purposes are classified, for convenience, with data relating to production of these same materials for structural purposes. However, statistics pertaining to their consumption for industrial purposes are segregated in the following tables.

Table 357.—Value of Construction Contracts Awarded, by Provinces, 1933-1937

(Maclean Building Reports Ltd)

Provinces	1933	1934	1935	1936	1937
	\$	\$	\$	\$	\$
Maritimes.....	7,218,700	9,968,600	14,373,500	17,908,800	21,557,200
Quebec.....	32,539,200	34,135,500	44,471,900	45,749,500	71,940,800
Ontario.....	42,573,400	63,358,300	70,872,800	72,393,300	97,777,400
Manitoba.....	2,138,000	3,905,000	8,744,400	6,994,400	7,945,100
Saskatchewan.....	775,200	1,563,200	3,841,300	2,200,600	6,704,900
Alberta.....	2,825,900	3,489,400	5,893,000	6,297,400	4,901,000
British Columbia.....	9,219,400	9,391,500	12,108,100	11,044,000	13,230,300
Canada.....	97,289,800	125,811,500	160,305,000	162,588,000	224,056,700

At the beginning of 1938 a project was undertaken for the preparation of a model building code for Canada. It is under the joint auspices of the National Research Council, the Dominion Housing Administration and the Dominion Fire Commissioner and has been organized on a very comprehensive basis.

The purpose of the work is to establish minimum standards applicable to construction requirements, fire protection and considerations affecting health and sanitation for the guidance of municipalities in preparing their own codes. Actually it is hoped that by careful attention to the fundamental principles involved it will be possible to prepare a document that municipalities, large and small, will be able to adopt without alterations.

Work on the code is being prosecuted actively at the present time and it is planned to have it ready for press towards the end of 1939. Some 120 committee members are co-operating in various phases of the work. Advantage is being taken of recent developments in the building materials field and a considerable amount of research work is being done as the work progresses. It is hoped that the code when completed will be fully equal to the more authoritative ones at present in existence on this continent and that it will do much towards placing the use of building materials in this country on a more scientific basis.

Sales Tax.—Under an Act to amend the Special War Revenue Act, assented to 1st July, 1938, the following building materials, among others, were exempted from sale tax for the first time:—

Bricks; building tile (including floor and wall tile); building blocks and building stone (including artificial stone and crushed stone, granite, and marble trim for buildings only); plaster (including hard wall plaster); lime; cement (including cement blocks); stucco and stucco dash; materials manufactured wholly or in part of vegetable or mineral fibre for wall coverings or building insulation; glass for buildings; prepared roofings; shower baths, bathtubs, basins, faucets, closets, lavatories and sinks and laundry tubs, not including pipes and pipe fittings.

Articles and materials to be used or consumed exclusively in the manufacture or production of the aforementioned building materials but not to include materials consumed by waste or wear, or abrasives, lubricating oils, fuel oils, permanent or non-permanent plant equipment.

The following refractories are also free from sales tax under amendments of previous years:—

Firebrick, plastic refractories, high temperature cement, fireclay and other refractory materials for use exclusively in the construction or repair of a furnace, kiln or other equipment of a manufacture's establishment, and materials to be used or consumed exclusively in the manufacture of such firebrick or refractory materials.

Table 358.—Description, Classification and Value of Work Performed by General and Trade Contractors (including Subcontractors), Municipalities, Harbour Commissions, Provincial and Dominion Government Departments in 1936 and 1937

Compiled by Construction Branch Dominion Bureau of Statistics.

	1936	1937		1936	1937
	Total Value †	Total Value †		Total Value †	Total Value †
	\$	\$		\$	\$
BUILDING CONSTRUCTION			ENGINEERING CONSTRUCTION—con.		
Dwellings, single.....	22,175,417	29,231,314	Railway (steam) construction work.....	708,482	2,631,983
Dwellings, semi-detached or double.....	2,220,514	2,728,090	Railway (electric) construction work.....		247,476
Duplexes.....	2,840,487	2,890,972	Aerodromes or landing fields.....	284,275	1,172,125
Apartment houses.....	4,029,211	5,825,241	Park systems.....	1,426,396	1,895,226
Hotels, clubs, restaurants, etc.....	1,875,011	3,174,010	Grounds and walks.....	272,635	312,204
Churches and church halls.....	1,725,153	2,538,511	Underground conduits.....	179,278	261,705
Hospitals and sanatoria.....	3,518,696	3,791,606	Engineering, unable to specify.....	4,628,004	7,588,801
Schools, institutions, etc.....	3,973,038	7,260,284			
Office buildings.....	4,517,444	8,362,412	HARBOURS, RIVERS, ETC.		
Stores.....	5,781,560	7,915,622	Docks, wharves, piers and breakwaters.....	8,978,293	8,001,048
Theatres.....	1,890,867	1,665,743	Retaining walls, embankments and riprapping.....	1,182,404	1,361,085
Factories, warehouses and storehouses.....	17,206,512	35,982,590	Canals and waterways.....	25,987	369,541
Grain elevators.....	3,109,680	3,281,431	Dredging.....	4,397,359	4,654,314
Garages.....	1,582,910	2,246,870	Pile driving.....	125,901	258,390
Service stations.....	1,802,582	2,122,145	Works, unable to specify.....	58,004	13,894
Mine buildings.....	6,430,177	4,799,235			
Farm buildings.....	777,063	1,344,309	TRADE CONSTRUCTION		
Government and municipal buildings.....	12,791,733		Air conditioning.....	68,322	613,650
Buildings, unable to specify.....	1,850,778	5,378,613	Brick laying.....	926,389	905,156
			Carpentry work.....	1,376,644	1,206,546
ENGINEERING CONSTRUCTION			Commercial refrigeration.....	117,354	903,428
Hard surfaced or paved streets and highways.....	22,575,420	38,625,244	Concreting and cement work.....	1,092,831	967,629
Gravel or stone surfaced streets and highways.....	25,299,212	29,914,507	Electrical work.....	4,367,579	5,224,308
Dirt or clay streets and highways.....	3,683,735	7,620,496	Elevators, service.....	1,487,768	1,822,697
Grading, scraping, oiling, filling, etc.....	5,483,573	12,522,674	Excavating.....	626,738	1,187,579
Sidewalks.....	1,155,962	1,255,254	Flooring, wood.....	199,372	243,898
Roadside maintenance and area improvement.....	1,434,537	2,127,635	Flooring, other.....	112,801	160,703
Bridges, viaducts, etc.....	8,256,629	12,351,378	Glass and glazing.....	615,673	579,095
Subways, overhead crossings, etc.....	498,662	729,891	Lathing, plastering and stucco.....	1,018,783	1,265,421
Culverts, all types.....	1,309,011	2,352,746	Masonry and stone work.....	307,632	306,398
Watermains and connections.....	4,100,030	4,870,399	Ornamental iron work.....	357,407	298,097
Sewers and connections.....	3,880,020	2,572,198	Painting and decorating.....	4,515,377	4,964,660
Storm sewers.....		1,062,043	Plumbing, heating and sanitary engineering.....	14,065,174	16,363,778
Tile drains, drainage ditches and open sewers.....	647,586	529,453	Roofing, sheet metal.....	914,382	1,076,686
Dams and reservoirs.....	1,134,120	1,904,123	Roofing, all other.....	1,253,236	1,961,479
Fencing (excluding temporary snow fencing).....	369,562	890,980	Sheet metal work, other than roofing.....	2,451,464	3,041,028
Guard rails.....		274,645	Sprinkler installation.....	369,977	577,956
Signs.....	218,572	242,135	Structural steel work.....	936,630	1,652,550
Zone painting.....		124,682	Tiling, marble and terrazzo.....	618,432	743,028
Electric stations, power plants, etc.....	8,682,786	14,988,028	Weatherstripping and insulation.....	530,985	683,351
Transmission lines and towers.....	5,112,591	9,593,047	Wrecking and demolition.....	310,709	226,287
Installation of boilers and machinery.....	2,351,032		Trades, unable to specify.....	939,850	880,328
			Total value of work performed	258,040,400	351,874,114

† Includes value of new construction and alterations, maintenance and repairs.

Table 359.—Description and Value of Work Performed in Canada by all Trade and Subcontractors, 1936 and 1937 (*)

Nature	1936	1937	Nature	1936	1937
	\$	\$		\$	\$
Brick laying.....	1,547,282	1,838,891	Roofing.....	3,789,420	5,069,698
Carpentry work.....	1,802,885	1,759,484	Sheet metal work, other than roofing.....	3,339,946	4,751,018
Concreting and cement work.....	2,028,503	2,094,417	Tiling and marble work.....	2,337,585	2,436,764
Electrical work.....	6,694,776	8,449,179	Weatherstripping and insulation.....	855,889	982,843
Elevators, service.....	2,552,853	2,427,053	Sprinkler installation.....	522,650	1,032,847
Excavating.....	540,398	915,976	Structural steel work.....	10,249,627	16,199,867
Flooring, all kinds.....	740,104	1,120,029	Air conditioning.....	96,275	974,495
Glass and glazing.....	1,797,248	2,369,274	All other trades.....	4,175,320	5,860,701
Heating and plumbing.....	19,476,547	23,436,065			
Lathing, plastering and stucco.....	3,066,348	3,638,632	(b) Total value of work performed.....	73,434,730	94,067,618
Masonry and stone work.....	966,258	1,049,419			
Ornamental iron work.....	1,095,986	1,198,885			
Painting and decorating.....	5,755,830	6,462,081			

(*) Supplied by the Construction Branch, Dominion Bureau of Statistics.

(b) Includes cost of materials used, etc.

NOTE:—These values are included in the preceding table.

Table 360.—Value of Clay Products and Other Structural Materials Produced in Canada, by Provinces, 1932-1937

Province	1932	1933	1934	1935	1936	1937
	\$	\$	\$	\$	\$	\$
Prince Edward Island.....					27,663*	
Nova Scotia.....	432,075	378,320	511,026	1,660,981	1,763,516	2,293,325
New Brunswick.....	779,492	644,570	669,726	1,241,957	931,827	1,128,931
Quebec.....	8,062,951	5,747,715	6,115,682	7,241,494	7,503,022	10,350,583
Ontario.....	8,827,968	7,340,086	8,988,681	8,894,538	10,326,967	15,121,178
Manitoba.....	1,259,733	667,012	761,742	1,459,614	1,666,789	1,673,124
Saskatchewan.....	176,681	111,938	260,030	269,320	380,115	585,673
Alberta.....	1,039,093	654,334	843,629	973,774	1,245,549	1,303,533
British Columbia.....	1,820,290	1,152,712	1,136,245	1,473,722	1,925,293	2,413,352
Canada—Gross value.....	22,398,283	16,696,687	19,286,761	23,215,400	25,770,741	34,869,699
Net value.....	(a)	(a)	(a)	19,253,309	21,052,574	28,868,189

(a) Information not available.

* Sand and gravel only.

Table 361.—Production, Imports, Exports, and Apparent Consumption of Clay Products and Other Structural Materials in Canada, 1934-1937

Item	Production	Imports	Exports	Apparent consumption
	\$	\$	\$	\$
Cement, Portland.....	1934 5,667,946	149,715	55,181	5,662,480
	1935 5,580,043	177,181	44,365	5,612,859
	1936 6,908,192	114,321	56,909	6,965,604
	1937 9,095,867	119,857	82,978	9,192,746
Clay and clay products.....	1934 2,680,410	5,935,805	186,359	8,429,856
	1935 3,012,563	6,438,042	363,164	9,087,441
	1936 3,471,027	7,351,148	526,856	10,295,319
	1937 4,516,859	9,108,976	596,970	13,028,865
Lime.....	1934 2,745,797	5,118	151,983	2,598,932
	1935 2,925,791	9,181	50,296	2,884,676
	1936 3,335,970	12,036	97,574	3,250,432
	1937 3,824,917	32,379	85,489	3,771,807
*Sand and gravel.....	1934 4,035,477	283,088	17,079	4,301,486
	1935 6,389,440	364,693	21,446	6,732,687
	1936 6,921,399	348,492	73,624	7,196,267
	1937 10,492,696	471,367	78,441	10,885,622
Slate.....	1934 4,802	(a) 40,966		45,768
	1935 4,329	(a) 36,388		40,717
	1936 5,414	(a) 34,155		39,569
	1937 5,519	(a) 54,771		60,290
Stone (b).....	1934 4,152,329	447,668	104,969	4,495,018
	1935 5,303,234	415,924	110,895	5,608,263
	1936 5,128,739	448,526	105,182	5,472,083
	1937 6,938,841	692,747	250,458	7,381,130
Total.....	1934 19,286,761	6,762,360	515,571	25,533,540
	1935 23,215,400	7,341,409	590,166	29,966,643
	1936 25,770,741	8,308,678	860,145	33,219,274
	1937 34,874,699	10,540,097	1,094,336	44,320,460

*Sand and gravel imports include silica sand for glass and carborundum manufacture and for use in steel plants. This silica sand was valued at \$226,188 in 1934, \$282,930 in 1935, \$270,824 in 1936 and \$373,760 in 1937.

†Includes cement manufactures.

(a) Includes slate manufactures.

(b) Exclusive of slate.

CEMENT

Canadian producers' sales of Portland cement in 1937 totalled 6,168,971 barrels valued at \$9,095,867 compared with 4,508,718 barrels at \$6,908,192 in 1936. The volume of sales and apparent consumption of cement in the Dominion during 1937 were the largest since 1931, in which year sales and consumption totalled 10,161,658 barrels and 10,085,986 barrels, respectively. The all-time high records in quantity and value of sales by the Canadian cement industry occurred in 1929 in which year producers' shipments totalled 12,284,081 barrels valued at \$19,337,235.

Reflected in the increased output of cement in 1937 by the four Canadian cement companies is the fact that all branches of the construction industry in Canada experienced better conditions during the year than have existed since 1931. According to the "MacLean Building Review" contracts awarded in Canada in 1937 amounted to \$224,056,700, an increase of 37.8 per cent over the 1936 total of \$162,588,000.

During the year under review, cement plants were operated in the provinces of Quebec, Ontario, Manitoba, Alberta, and British Columbia and of the total quantity of cement shipped by producers in 1937, 42.97 per cent came from Ontario plants, and 41.79 per cent from those located in the province of Quebec. Of the nine cement plants in production during 1937, seven employed the wet process of manufacture and one, the dry method; in addition, a single Canadian cement plant produced finished cement from purchased clinker.

Raw materials consumed by the industry in 1937 included 1,465,168 tons of limestone, 33,691 tons of gypsum, 9,281 tons of sand, 195,877 tons of clay, and 444 tons of pyrites. Electricity purchased during the year totalled 61,045,600 kilowatt hours valued at \$606,969 and coal consumed comprised 145,791 short tons of Canadian bituminous valued at \$760,766 and 90,925 short tons of imported bituminous at \$513,417. The total value of all fuels and electricity used by the entire industry in 1937 amounted to \$1,904,418 compared with \$1,576,142 in the preceding year.

In 1937 capital employed by the industry, and representing value of plants, stocks on hand, etc., was reported at \$54,150,672, employees totalled 1,083, and salaries and wages distributed aggregated \$1,373,444. Process supplies, other than fuels, consumed in 1937 were valued at \$540,915 and the net value of sales was estimated at \$6,650,534.

Production of Portland cement in the United States in 1937 increased to 116,174,708 barrels and shipments to 113,804,782 barrels valued at \$166,835,208, according to statistics published by the United States Bureau of Mines; the average factory price per barrel in bulk was \$1.48 in 1937. Figures on special cements in the United States in 1937 show high-early strength Portland cement produced totalled 4,192,959 barrels and shipments from mills, 3,845,314 barrels at an average of \$1.86 per barrel. Masonry cement of the Portland cement class shipped totalled 273,144 barrels at \$1.33 per barrel. Low and moderate heat of hardening Portland cement, including Tennessee Valley authority Type B Portland cement, shipments from mills totalled 3,511,674 barrels at \$1.43 per barrel. Portland-Puzzolan cement, including cement reported as "High Silica" shipped from mills totalled 294,384 barrels at \$1.42 per barrel. Nine plants located in the oilbearing States of California, Texas, and Wyoming reported production of 342,316 barrels of Portland cement adopted for use in grouting in oil wells. The United States Bureau of Mines comments on Puzzolanic material as follows:—"The most widely used artificial Puzzolanic material in the United States is blast-furnace slag. Slag cements, corresponding in character with the ancient Puzzolanic cements, are made by mixing ground slag with the proper proportion of hydrated lime and grinding the mixture in a tube mill. The product of the mill is then calcined. To avoid confusion, it may be noted that slag is used as a cement constituent in three distinct ways,—(1) with limestone, as a raw material for making Portland cement, (2) with lime for making slag cement and (3) as a reactive agent in Portland-Puzzolanic cements. The addition of Puzzolanic materials to Portland cement has, in general, the effect of increasing the strength and chemical resistance of the concrete."

Table 362.—Summary Statistics of Cement Production, Sales, Etc., in Canada, 1936 and 1937

	1936		1937	
	Barrels (*)	Value	Barrels(*)	Value
		\$		\$
Output.....	4,939,030		6,142,934	
Sold or used.....	4,508,718	6,908,192	6,168,971	9,095,867
Stocks on hand December 31st.....	1,832,380		1,806,343	
IMPORTS—				
Portland cement and hydraulic or water lime.....	39,867	107,180	61,082	134,113
Manufactures.....		7,141		45,744
Total Imports.....		114,321		179,857
EXPORTS—				
Portland cement.....	68,929	56,909	72,568	82,978
Apparent consumption.....	4,479,656		6,157,485	

(*) 1 barrel=350 pounds.

Table 363.—Producers' Sales of Cement in Canada, by Provinces, 1935-1937

Province	1935		1936		1937	
	Barrels	Value	Barrels	Value	Barrels	Value
		\$		\$		\$
Quebec.....	1,751,012	2,472,008	2,093,130	2,945,074	2,578,623	3,537,798
Ontario.....	1,243,836	1,752,148	1,542,463	2,180,895	2,650,652	3,657,067
Manitoba.....	266,457	604,857	348,042	783,095	323,515	745,736
Alberta.....	219,555	436,914	243,534	482,197	267,106	531,541
British Columbia.....	167,226	314,116	281,549	516,931	344,072	623,725
Canada.....	3,648,086	5,580,043	4,508,718	6,908,192	6,168,971	9,095,867

Table 364.—Production and Apparent Consumption of Cement in Canada, 1926-1937

Year	Sold or Used		Apparent Consumption
	Barrels	\$	Barrels
1926.....	8,707,021	13,013,283	8,442,203
1927.....	10,065,865	14,391,947	9,835,525
1928.....	11,023,928	16,739,163	10,790,650
1929.....	12,284,081	19,337,235	12,105,950
1930.....	11,032,538	17,713,067	10,977,238
1931.....	10,161,658	15,826,243	10,085,986
1932.....	4,498,721	6,930,721	4,466,738
1933.....	3,007,432	4,536,935	2,974,020
1934.....	3,783,226	5,667,946	3,727,521
1935.....	3,648,086	5,580,043	3,610,217
1936.....	4,508,718	6,908,192	4,479,656
1937.....	6,168,971	9,095,867	6,157,485

Table 365.—Kilns Used by Canadian Cement Industry, 1931-1937

Year	Rotary	Vertical	Total Daily Capacity
	Number	Number	Barrels
1931.....	43	1	42,422
1932.....	47		43,822
1933.....	41		43,622
1934.....	41		43,922
1935.....	20		32,650
1936.....	19		33,000
1937.....	18		33,900

Table 366.—Specified Materials Used in Canadian Cement Plants, 1931-1937

Year	Limestone	Gypsum	Sand	Clay	Pyrites
	Tons	Tons	Tons	Tons	Tons
1931.....	2,489,147	56,677	(a)	(a)	(a)
1932.....	1,141,376	27,538	(a)	(a)	(a)
1933.....	616,364	13,319	(a)	(a)	(a)
1934.....	806,546	19,172	(a)	(a)	(a)
1935.....	818,443	21,611	5,047	(a)	(a)
1936.....	1,180,358	25,447	8,549	94,943	(a)
1937.....	1,465,168	33,691	9,281	195,877	444

(a) Data not recorded.

Table 367.—Principal Statistics of the Cement Manufacturing Industry in Canada, 1935-1937

	1935	1936	1937
Number of firms.....	4	4	4
Number of plants.....	9	9	9
Capital employed.....	\$ 52,454,004	53,343,991	54,150,672
Number of employees—On salary.....	78	84	100
On wages.....	846	968	983
Total.....	924	1,052	1,083
Salaries and wages—Salaries.....	\$ 150,587	173,001	211,778
Wages.....	\$ 876,829	1,023,663	1,161,666
Total.....	\$ 1,027,416	1,196,664	1,373,444
Selling value of products (Gross).....	\$ 5,580,043	6,908,192	9,095,867
Cost of fuel and electricity (b).....	\$ 1,227,410	1,576,142	1,904,418
Cost of process supplies (c).....	\$ 394,264	592,929	540,915
Net value of products sold.....	\$ 3,958,369	4,739,121	6,650,534

(c) Other than item (b).

Table 368.—Capital Employed in the Cement Industry in Canada, 1937

	\$
CAPITAL EMPLOYED AS REPRESENTED BY:—	
(a) Present cash value of the land.....	11,421,726
(b) Present value of buildings, fixtures, machinery, tools and other equipment.....	35,902,955
(c) Inventory value of materials on hand, ore in process, fuel and miscellaneous supplies on hand.....	852,259
(d) Inventory value of finished products on hand.....	1,298,517
(e) Operating capital (cash, bills and accounts receivable, prepaid expenses, etc.).....	4,675,215
Total.....	54,150,672

Table 369.—Wage-Earners on the 15th of Each Month, or Nearest Representative Date, 1935-1937

Month	1935	1936	1937	
			Quarry	Mill
January.....	705	765	66	691
February.....	660	748	55	729
March.....	671	815	65	782
April.....	687	1,027	126	865
May.....	802	1,124	117	868
June.....	920	1,061	136	954
July.....	937	1,084	140	955
August.....	947	1,038	140	950
September.....	1,042	1,049	139	947
October.....	964	1,048	141	941
November.....	943	983	129	935
December.....	896	860	81	866

Table 370.—World's Production of Cement, 1929, 1936 and 1937.

NOTE.—This table covers, as far as possible, both natural and artificial (Portland, etc.) cements. Cement is made by burning a mixture of calcareous and argillaceous materials and grinding the resulting clinker. For natural cement, the mixture used is found as such in nature; for artificial cements, the constituents are mixed in the desired proportions.

(Taken from the Statistical Year-Book of the League of Nations)

(Metric tons—000's omitted)

Country	1929	1936	1937
Africa	760	1,346	1,500
Algeria.....	58	67	.....
Belgian Congo.....	60	21	.....
Egypt.....	180	335	330
Morocco (French).....	65	160	156
Mozambique.....	21	12	.....
Tunis.....	.....	49	56
Union of South Africa.....	376 (a)	702	840
North America	31,426	20,291	21,175
Canada.....	1,945	784	975
United States.....	29,481	19,507	20,200
Caribbean (Mexico)†	225	286	.....
South America	(*)650	1,780	.....
Argentina.....	350	869	1,010
Brazil.....	96	483	.....
Chile.....	145	248	313
Colombia.....	.....	105	.....
Peru.....	49	75	83
Asia	5,570	7,470	(*)8,400
China (1).....	185	187	.....
India.....	570	977	1,142
Netherland Indies.....	149	.....	.....
French Indo-China.....	184	149	235
Japan and col.....	4,274	5,456	6,034
Palestine.....	69	165	158
Philippines.....	76	133	.....
Siam.....	62	62	77
Syria and Lebanon.....	.....	190	250
U.S.R.R.	2,367	5,845	.....
Europe (2)	34,190	(*)37,500	.....
Germany (3).....	7,039	11,689	.....
Saar.....	167		.....
Austria.....	582	369	.....
Belgium (4).....	3,248	2,350	.....
Bulgaria.....	151	122	154
Denmark.....	799	792	676
Spain.....	1,820	.....	.....
Estonia.....	62	50	69
Finland.....	278	351	.....
France.....	5,787	4,272	.....
Greece.....	155	277	.....
Hungary.....	403	215	.....
Italy.....	3,497	3,859	4,258
Latvia.....	40	98	118
Norway.....	319	301	(*)340
Netherlands.....	210	401	441
Poland.....	1,008	1,048	1,284
Portugal.....	88	245	254
Roumania.....	317	376	389
United Kingdom.....	4,766	6,700	7,300
Sweden.....	570	795	.....
Czechoslovakia (*).....	1,250	1,050	.....
Turkey.....	65	178	.....
Yugoslavia.....	874	643	591
Oceania (*) (2)	920	850	.....
Australia (a).....	720	656	.....
(*) Total	75,880	75,980	.....

(*) Estimate. (a) Twelve months ending June 30.

† Country not included in the totals.

(1) China: total shipments from "Customs ports," excluding Manchuria.

(2) Europe, Oceania: total includes estimate for other countries not mentioned.

(3) Germany: 1929, German Cement Association.

(4) Belgium: artificial cement.

THE CEMENT PRODUCTS INDUSTRY

Production of manufactured cement products in Canada during 1937 was valued at \$3,299,331. This output was the best reported for the industry since 1931 when the value amounted to \$3,807,188 and it was almost double the total of \$1,713,347 reported for 1936. The increase over last year, however, was due chiefly to the inclusion, for the first time, of the output of ready-mixed concrete which formerly was not classed as a manufactured product. The output of ready-mixed concrete in 1937 was valued at \$1,230,451.

Data presented for this industry cover manufacturing only and do not include figures for the cement work done on the building of bridges, dams, foundations, etc.; this type of work has been covered in the annual survey of construction.

Table 371—Value of Products made in the Cement Products Industry, by Provinces, 1937

Products	Quebec	Ontario	British Columbia	Other provinces	Canada
	\$	\$	\$	\$	\$
Cement bricks.....	16,638	129,567		317	146,522
Cement hollow building blocks, etc.....	100,297	265,976	4,961	8,774	380,008
Cement drain pipe, sewer pipe, water pipe and culvert tile.....	95,412	228,150	24,832	28,692	377,806
Artificial stone.....	92,478	77,712	1,006	16,825	188,201
Cement laundry tubs.....		29,650	9,530		39,180
Cinder blocks.....	17,874	190,275			208,149
Cement stucco.....	6,550		8,688	8,214	23,452
All other products.....	638,475	1,097,200	197,278	3,960	1,936,193
Total.....	967,724	2,018,530	246,295	66,782	3,299,331

Table 372.—Value of Materials Used in the Cement Products Industry, by Provinces, 1937

Materials	Quebec	Ontario	British Columbia	Other provinces	Canada
	\$	\$	\$	\$	\$
Portland cement.....	264,783	457,181	86,484	11,469	819,917
Quicklime.....	328	22	1,033	201	1,584
Sand.....	94,811	72,201	26,902	2,908	196,822
Gravel.....	1,293	60,576	160	2,648	64,677
Crushed stone.....	117,051	51,223	2,167	94	170,535
Cinders.....	2,535	18,886			21,421
Reinforcing steel.....	9,503	56,738	2,834	2,681	71,756
Other materials.....	27,868	172,620	11,008	1,952	213,448
Boxes, crates, lumber, etc.....	1,794	2,089	2,254	573	6,710
Total.....	519,966	891,536	132,842	22,526	1,566,870

CLAY AND CLAY PRODUCTS INDUSTRY

The Clay and Clay Products Industry in Canada is classified into two divisions: (1) production from domestic clays, which includes the production of refractories, building brick, structural tile, floor tile, roofing tile, drain tile, sewer pipe and pottery, and (2) production from imported clays, which includes the manufacture of porcelain insulators, refractories, earthenware, pottery and ceramic floor and wall tile.

A total of 162 plants representing a total capital investment of \$24,884,341 operated in the domestic and imported clay products industries in Canada during 1937. These two industries provided employment for 3,505 persons during the year; their earnings totalled \$3,360,705. The combined production in 1937 was valued at \$8,116,040 compared with \$6,377,459 in 1936.

1. Production from Domestic Clays

The gross value of Canadian producers' sales of domestic clay products totalled \$4,516,859, in 1937; this represents an increase of 30·13 per cent over 1936 and the total value of the 1937 output was the greatest since that recorded for 1931. Ontario and Quebec continued as the Dominion's largest producers of materials manufactured from Canadian clays; of the total value of production in 1937, products from plants in Ontario were reported at \$2,033,845 while shipments by firms operating in Quebec totalled \$1,053,153. Commercial production of domestic clay products in 1937 was reported in every province except Prince Edward Island and the Territories.

Especially reflecting the better conditions recently experienced by all branches of the construction industry was an increase of 32·87 per cent in volume and 35·82 per cent in value in the production of building brick as compared with 1936. During the trade expansion of the late twenties Canadian production of building brick reached 458,630 M valued at \$8,003,358 in 1929 while the all-time high record in building brick output was realized in 1912 when sales totalled 894,372 M at \$8,620,229. The industrial depression during the early part of the past decade and, to a lesser extent, the increasing competition from other building materials were largely responsible for the drastic decline in the consumption of brick immediately following 1929 and it is gratifying to note that the industry has realized steady and unbroken annual increases in brick production since 1933.

Drain tile and sewer pipe production in 1937 was valued at \$1,089,180, an increase of 35·63 per cent over that in 1936 and the production of refractories from Canadian clays was considerably greater than for some years past. In 1937 fireclay and fireclay blocks and shapes were commercially produced in Nova Scotia, New Brunswick, Saskatchewan and British Columbia, while firebrick from domestic clays was manufactured in Saskatchewan, Alberta and British Columbia.

Production of pottery in Canada from domestic clays totalled \$232,209 in 1937 compared with \$218,402 in 1936 and \$356,093 in 1928, the year which showed the greatest production of Canadian pottery ever recorded. Also indicative of the recovery in building was a production in 1937 of 64,526 tons of hollow blocks valued at \$533,843, this being the largest output of the material since 1931; these particular clay products were produced in all provinces with the exception of Prince Edward Island. There is no recorded commercial production of clay products in the Territories. For several years past a relatively small tonnage of bentonite has been produced in British Columbia and it is noteworthy that in 1937 the Dominion commercial output of this clay was increased by the production of 132 tons from deposits located in the province of Manitoba. The Bureau of Mines, Ottawa, reports that bentonite, both crude and activated, is often marketed and distributed under a variety of trade names which tend to conceal its identity, even being sold as "common clay"; it is thus difficult to obtain accurate figures of the amounts imported and consumed in Canada.

China clay has been produced commercially in Canada only from the vicinity of St. Remi d'Amherst, Papineau county, Quebec. Production has been spasmodic for some years. A group of open pits and mines was operated for several years prior to 1923. In 1931 a property in this area was developed mainly for the production of silica, but a small amount of china clay was also produced. The Bureau of Mines, Ottawa, states that in 1937 fresh development work was undertaken in this area, when, under new management, a shaft was sunk into the kaolinized quartzite deposit to a depth of 200 feet. A mill was being installed for the production of washed china clay and washed silica. Deposits of high-grade, white-burning clays occur on the Mattagami, Abitibi, and Missinaibi Rivers in Northern Ontario; some of these clays are classed as ball clays and others as china clays. Ball clays of high bond strength occur in extensive deposits in Southern Saskatchewan.

The number of firms comprising the domestic clay products industry of Canada and which were reported as active in 1937 totalled 137 compared with 133 in 1936. Census records show 426 brick and tile producers in Canada during 1871 and 343 in 1886.

Tariff Revisions.—Trade agreements between Canada and the United States and between the United Kingdom and the United States were signed at Washington on Thursday, November 17, 1938. The following statement prepared by the United States Tariff Commission shows the former and new rates of duty on certain clay products in Schedule II (United States concessions

to Canada), and the total imports of such products into the United States and the imports of such from Canada according to preliminary United States statistics for the year 1937:—Fire-brick, not specially provided for; rate of duty under tariff act of 1930, 25 per cent; under 1935 agreement, 15 per cent; under new agreement, 12½ per cent; total value of all such imports in 1937 was \$37,601; from Canada only, \$29,912. Brick, not specially provided for, not glazed, enamelled, etc., under tariff act of 1930, rate of duty, \$1.25 per thousand; under 1935 agreement, \$1.25 per thousand; under new agreement, \$1 per thousand; total value of all such imports in 1937, \$15,501; from Canada only, \$9,934. Bentonite, unwrought and unmanufactured; duty under tariff act of 1930 and the 1935 agreement, \$1.50 per ton; under new agreement, 75 cents per ton; there were no imports of crude bentonite into the United States in 1937. Wrought or manufactured bentonite; duty under the 1930 tariff and 1935 agreement, \$3.25 per ton; under new agreement, \$1.62½ per ton; in 1937 the value of imports of manufactured bentonite into the United States was \$30.

Table 373.—Production of Clay Products in Canada from Domestic Clays, by Provinces, 1928-1937 (Gross Values)

Year	Nova Scotia	New Brunswick	Quebec	Ontario	Manitoba	Saskatchewan	Alberta	British Columbia	Canada
	\$	\$	\$	\$	\$	\$	\$	\$	\$
1928.....	496,577	72,192	3,097,295	6,177,664	291,791	377,896	1,162,264	706,039	12,381,718
1929.....	653,157	160,006	3,187,702	6,830,162	362,240	502,522	1,342,427	866,427	13,904,643
1930.....	495,333	162,536	2,464,044	5,221,214	215,967	349,283	997,685	687,516	10,593,578
1931.....	467,126	143,348	2,360,908	3,552,800	122,628	166,257	529,716	498,505	7,841,288
1932.....	172,557	68,151	1,064,551	1,639,508	49,773	109,739	329,584	216,355	3,650,218
1933.....	125,500	46,917	580,088	1,024,579	20,966	92,207	198,373	174,205	2,262,835
1934.....	157,158	59,897	632,322	1,261,006	37,916	90,997	246,677	194,437	2,680,410
1935.....	270,478	62,478	593,162	1,370,225	74,755	98,150	326,679	216,636	3,012,563
1936.....	355,254	102,256	691,765	1,573,936	55,564	95,584	315,777	280,891	3,471,027
1937.....	406,846	123,876	1,053,153	2,033,845	95,531	115,330	338,638	349,640	4,516,859

Table 374.—Production (Sales) of Domestic Clay and Clay Products in Canada, 1936 and 1937

Products	Unit of measure	Sales or shipments			
		1936		1937	
		Quantity	\$	Quantity	\$
Clay—Fullers' earth.....	ton				
Bentonite.....	ton	(*)120	180	163	1,971
Fireclay.....	ton	2,437	17,639	4,123	26,081
Kaolin (china clay).....	ton				
Fireclay blocks and shapes.....	\$		65,171		75,431
Firebrick.....	M	2,548	118,923	2,950	142,827
Brick—Soft mud process—Face.....	M	6,097	111,378	9,904	175,544
Common.....	M	24,180	302,690	23,636	316,534
Stiff mud process—Face.....	M	30,218	575,765	37,610	735,615
(wire cut) Common.....	M	35,592	484,078	55,689	755,630
Dry press —Face.....	M	8,961	165,924	12,565	233,542
Common.....	M	10,241	100,785	14,136	152,662
Fancy or ornamental brick (including special shapes, embossed and enamelled brick).....	M	25	1,374	55	2,972
Sewer brick.....	M	418	6,778	175	2,777
Paving brick.....	M	116	3,149	3	131
Structural tile—					
Hollow blocks (including fireproofing and load-bearing tile).....	ton		467,860	64,526	533,843
Roofing tile.....	No.	52,730	2,139	60,542	3,302
Floor tile (quarries).....	Sq. ft.	97,738	13,798	73,191	12,169
Ceramic or glazed floor and wall tile.....	\$				
Drain tile.....	M	8,148	214,590	11,391	298,970
Sewer pipe (including copings, flue linings, etc.).....	\$		588,485		(b)790,210
Pottery, glazed or unglazed (including coarse earthenware, stoneware, flower pots, and all other pottery).....	\$		218,402		232,209
Other products.....	\$		11,919		24,439
Total.....	\$		3,471,027		4,516,859

(*) Partly used for experimental purposes.

(b) Includes value of clay conduits.

NOTE:—In addition to the clays recorded in this table, there were 195,877 tons of ordinary clay consumed in Canada during 1937 in the production of Portland cement; the corresponding consumption in 1936 was 94,943 short tons.

Table 375.—Production of Building Brick in Canada, 1928-1937

		Soft mud process		Stiff mud process (wire cut)		Dry press		Fancy or orna- mental brick	Sewer brick	Total
		Face	Common	Face	Common	Face	Common			
1928	M	17,532	93,280	101,717	144,404	36,587	24,294	599	2,888	421,301
	\$	349,847	1,328,981	2,247,472	2,182,307	748,301	337,096	28,763	59,010	7,281,777
1929	M	26,624	77,399	114,093	170,840	38,591	26,131	187	4,765	458,630
	\$	538,096	1,195,511	2,469,417	2,509,451	813,461	368,039	12,795	96,588	8,003,358
1930	M	11,350	56,487	99,284	105,225	29,434	16,915	339	804	319,838
	\$	247,220	861,805	2,135,871	1,480,965	604,197	208,495	27,649	15,299	5,581,501
1931	M	5,476	41,177	77,135	81,930	20,149	8,688	335	2,253	237,143
	\$	116,316	619,357	1,752,947	1,205,464	423,357	107,213	20,773	43,692	4,289,119
1932	M	6,188	12,801	30,197	40,753	5,522	4,248	125	643	100,477
	\$	108,582	182,372	664,756	638,922	119,547	46,762	6,237	12,156	1,779,334
1933	M	2,482	12,389	19,602	23,894	4,544	3,916	630	243	67,700
	\$	41,737	156,769	412,367	356,498	101,252	44,377	7,824	3,693	1,124,517
1934	M	4,904	14,256	23,800	30,317	6,005	6,440	43	307	86,072
	\$	76,247	183,585	494,341	424,131	130,392	66,616	2,625	5,992	1,383,929
1935	M	6,695	21,197	25,289	32,334	8,454	6,381	13	175	100,538
	\$	122,215	259,504	500,066	437,123	175,042	55,253	728	5,236	1,555,167
1936	M	6,097	24,180	30,218	35,592	8,961	10,241	25	418	115,732
	\$	111,378	302,690	575,765	484,078	165,924	100,785	1,374	6,778	1,748,772
1937	M	9,904	23,636	37,610	55,689	12,565	14,136	55	175	153,770
	\$	175,544	316,534	735,615	755,630	233,542	152,662	2,972	2,777	2,375,276

Table 376.—Production of Paving Brick in Canada, 1928-1937

Year	Quantity		Value
	M	\$	
1928	338		4,464
1929	97		3,844
1930	9		297
1931	19		682
1932	1		155
1933	10		42
1934	15		382
1935	16		627
1936	116		3,149
1937	3		131

Table 377.—Production of Structural Tile in Canada, 1929-1937

Year	Hollow Blocks(*)		Roofing Tile		Floor Tile (Quarries)	
	Short tons	\$	No.	\$	Sq. ft.	\$
1929	221,800	2,214,384	35,075	4,628	307,400	70,186
1930	165,359	1,667,783	3,056	356	179,786	56,236
1931	105,635	1,046,634	6,935	720	107,499	31,415
1932	48,118	421,672	48,939	3,900	94,316	21,502
1933	26,747	160,059	20,469	1,136	91,495	14,297
1934	31,136	244,122	44,115	1,852	80,356	17,491
1935	47,195	344,608	82,015	3,669	51,765	7,629
1936	58,501	467,860	52,730	2,139	97,738	13,798
1937	64,526	533,843	60,542	3,302	73,191	12,169

(*) Including fireproofing and load-bearing tile.

(a) In addition, there was produced \$615 worth of ceramic tile.

Table 378, Production of Sewer Pipe, Copings, Flue Linings, etc., in Canada, 1928-1937

Year		Value	Year		Value
		\$			\$
1928		1,723,644	1933		354,458
1929		2,005,887	1934		436,433
1930		1,721,815	1935		481,559
1931		1,508,803	1936		588,485
1932		813,224	1937		790,210

Table 379.—Production of Drain Tile in Canada, 1928-1937

Year	Quantity	Value	Year	Quantity	Value
	M	\$		M	\$
1928.....	22,629	656,054	1933.....	10,057	222,829
1929.....	25,000	720,316	1934.....	7,325	180,553
1930.....	25,291	687,070	1935.....	7,124	205,336
1931.....	12,518	328,410	1936.....	8,148	214,590
1932.....	7,385	186,670	1937.....	11,391	298,970

Table 380.—Production of Pottery† from Domestic Clays in Canada, 1928-1937

Year	Value	Year	Value
	\$		\$
1928.....	356,093	1933.....	202,500
1929.....	323,194	1934.....	223,733
1930.....	294,866	1935.....	220,711
1931.....	257,125	1936.....	213,402
1932.....	244,861	1937.....	232,209

† Including coarse earthenware, stoneware, flower pots, and all other pottery.

Table 381.—Production of Kaolin* and Fireclay in Canada, 1928-1937

Year	Kaolin		Fireclay		Year	Kaolin		Fireclay	
	Quantity	Value	Quantity	Value		Quantity	Value	Quantity	Value
	Tons	\$	Tons	\$		Tons	\$	Tons	\$
1928.....	5	25	5,123	35,284	1933.....			1,421	11,273
1929.....			5,041	35,226	1934.....	48	504	1,043	12,598
1930.....			2,870	25,975	1935.....	170	1,520	2,272	15,574
1931.....			1,233	14,857	1936.....			2,437	17,639
1932.....			990	11,826	1937.....			4,123	26,081

* Produced in province of Quebec.

Table 382.—Production of Firebrick and Fireclay Blocks and Shapes in Canada, from Domestic Clays, 1928-1937

Year	Firebrick		Fireclay blocks and shapes	Year	Firebrick		Fireclay blocks and shapes
	Quantity	Value	Value		Quantity	Value	Value
	M	\$	\$		M	\$	\$
1928.....	4,919	234,460	105,091	1933.....	1,547	73,226	80,625
1929.....	5,196	251,043	130,411	1934.....	2,109	101,219	62,388
1930.....	3,789	177,608	147,309	1935.....	1,817	90,149	71,344
1931.....	2,248	107,597	83,039	1936.....	2,538	118,923	65,171
1932.....	1,580	71,757	75,209	1937.....	2,950	142,827	75,431

Table 383.—Production (Sales) of Bentonite in Canada, 1928-1937

Year	Bentonite (*)	
	Tons	\$
1928.....	20	100
1929.....		
1930.....	74	1,396
1931.....	187	935
1932.....	7	176
1933.....	55	1,363
1934.....	63	1,578
1935.....	41	781
1936.....	(a) 120	180
1937.....	163	1,971

(*) All from British Columbia 1928-1936 inclusive; 1937 includes 132 tons at \$1,154 produced in Manitoba and 31 tons at \$817 in British Columbia.

(a) Partly for experimental purposes.

Table 384.—Fullers' Earth Used in Canada in Specified Industries, 1930-1937

Year	Petroleum products		Soaps and washing compounds		Sugar refining		Vegetable oil mills	
	Pounds(*)	\$	Pounds	\$	Pounds	\$	Pounds	\$
1930.....	20,102,387	241,793	Data not available		(a)	(a)	(a)	(a)
1931.....	16,157,582	201,361	492,174	6,264	(a)	(a)	(a)	(a)
1932.....	19,642,179	258,934	507,807	7,444	(a)	(a)	102,650	1,773
1933.....	22,811,653	314,515	588,434	8,501	(a)	(a)	126,880	2,730
1934.....	18,588,514	239,357	508,316	6,562	(a)	(a)	115,120	2,171
1935.....	18,487,148	260,885	660,018	13,694	(a)	(a)	88,980	2,425
1936.....	18,907,295	243,164	1,328,219	20,601	59,200	1,730	243,720	10,044
1937.....	18,843,458	240,309	1,167,768	20,393	(a)	(a)	211,997	9,349

* Includes all clay.

(a) Not recorded.

NOTE:—In addition to the consumption recorded in the above table, there is a considerable quantity of fullers' earth used by the slaughtering industry.

Table 385.—China Clay (Kaolin) Used in the Manufacture of Paper in Canada, 1930-1937

Year	Tons	Value	Year	Tons	Value
		\$			\$
1930.....	13,024	218,423	1934.....	27,550	357,286
1931.....	11,484	173,660	1935.....	33,766	442,584
1932.....	14,432	205,068	1936.....	39,165	520,121
1933.....	20,048	267,014	1937.....	41,738	578,223

Table 386.—Firebrick and Fireclay Used in the Manufacture of Iron and Steel and their Products in Canada, 1931-1937

Year	Firebrick		Fireclay		Other fireclay, firebrick and cupola blocks
	Number	Value	Tons	Value	
		\$		\$	\$
1931.....	4,326,000	197,684	7,631	64,300	45,393
1932.....	3,409,000	123,532	5,910	52,492	36,395
1933.....	1,846,016	141,784	7,615	62,602	(b)11,628
1934.....	2,590,452	192,538	8,248	75,906	21,488
1935.....	(a)	451,604	11,510	101,601	28,064
1936.....	(a)	(a)	(c)777,014	(a)	(a)
1937.....	(a)	(a)	(c)1,061,787	(a)	(a)

(a) Not published separately.

(b) From 1933 includes only cupola blocks.

(c) Combined value for firebrick, fireclay and other fireclay only.

Table 387.—Clays and Earths Used in Canadian Rubber Industry, 1933-1937

Year	Tons	Value
		\$
1933.....	1,391	32,361
1934.....	2,391	54,368
1935.....	2,639	63,553
1936.....	3,067	70,709
1937.....	3,624	79,300

Table 388.—Imports into Canada and Exports of Clay and Clay Products, 1936 and 1937

	1936		1937	
	Quantity	\$	Quantity	\$
IMPORTS				
Building brick.....ton	2,544	24,310	1,477	18,485
Building blocks and fireproofing tile.....\$		7,274		17,121
Clays—China.....cwt.	833,807	342,654	1,103,891	445,073
Fire.....cwt.	1,398,931	192,640	1,590,207	250,393
Pipe.....\$		2,793		4,910
Other clays, n.o.p.....\$		238,159		224,160
Zirconium silicate.....\$		2,547		2,065
Zirconium oxide.....\$		23,133		32,668
Drain tile, unglazed.....\$		22		2,705
Drain, sewer pipe and earthenware fittings therefor, chimney linings or vents, chimney tops or inverted blocks, glazed or unglazed, n.o.p.....\$		15,297		20,322
Tiles or blocks of earthenware or stone prepared for mosaic flooring.....\$		46,377		44,869
Tiles, earthenware, for roofing purposes.....\$		6,120		13,621
Tiles, earthenware, n.o.p.....\$		132,305		138,033
Insulators, electric, porcelain.....\$		67,596		113,102
Pottery and chinaware.....\$		3,672,867		4,170,558
Brick, fire, other, valued at not less than \$100 per M, rectangular shaped; the dimensions of each not to exceed 125 cubic inches; for use exclusively in the construction or repair of a furnace, kiln, etc. \$		93,293		143,160
Brick, fire, n.o.p., for use exclusively in the construction or repair of a furnace, kiln, or other equipment of a manufacturing establishment (not made in Canada).....\$		357,733		449,301
Firebrick, n.o.p.....\$		608,749		989,603
Firebrick, chrome.....\$		68,082		103,287
Magnesite brick (fire).....\$		568,565		653,507
Silica brick (containing not less than 90 per cent silica).....\$		261,974		539,253
Paving brick.....ton	1,216	11,122	1,615	13,547
Artificial teeth, not mounted.....\$		337,252		387,024
Baths, bathtubs, basins, laundry tubs, etc., of earthenware, cement or clay, n.o.p.....\$		90,614		151,264
Ceramic insulator cores, not further manufactured than burned and glazed, printed or decorated or not, and without fittings, when imported by manufacturers of spark plugs for use exclusively in the manufacture of spark plugs in their own factories (*).....\$		54,516		
Saggars (a).....\$				4,646
Crucibles, clay or sand.....\$		54,162		38,839
Other manufactures of clay, n.o.p.....\$		70,992		137,460
Total.....\$		7,351,148		9,108,976
From—United Kingdom.....\$		3,573,639		4,166,926
United States.....\$		3,110,926		4,217,650
EXPORTS				
Building brick.....M	666	11,590	1,155	20,972
Clay—Unmanufactured.....cwt.	3,297	2,600	1,320	3,111
Manufactures of.....\$		36,803		69,505
Earthenware.....\$		82,936		60,565
Porcelain insulators.....\$		392,927		442,817
Total.....\$		526,856		596,970

(a) From February 26, 1937.

Cwt.=100 pounds.

Ton=2,000 pounds.

PRICES

Bentonite*—per ton, carload lots, f.o.b. Wyoming mines, dried and crushed, in bulk, \$8; in bags, \$10. f.o.b. Chicago, selected air-floated, \$25.

China Clay (Kaolin)*—per ton, f.o.b. South Carolina and Georgia mines, in bulk: saggars clays, \$2.50 to \$3.50; tailings, \$4.50 to \$5.00. No. 2 grades, \$5.50 to \$6.00; No. 1 grades, air-floated, crude, \$6.75 to \$8.00; No. 1 washed, \$8.00. Florida: washed, \$9.50 to \$11.75; air-floated and washed, \$13 to \$15. Maryland: ball clays, shredded bulk, \$3.75 to \$8.25; air-floated, in paper bags, \$15 to \$18.25. New Jersey: plastic kaolin, pulverized, in paper bags, \$10. Insecticide clay, \$11.50 to \$16.50. Imported English, per long ton, f.o.b. American ports: lump, \$20.00 to \$25.00 in bulk; air-floated, \$35 to \$60.

Fullers' Earth*—per ton, f.o.b. Colorado, \$9. f.o.b. Georgia or Florida, 30 to 60 mesh, \$14.50; 15 to 30, \$14; 200 and up, \$10; 100 and up, \$7.

Fullers' Earth†—English, carlots, ton, to \$32.00; Georgian, carlots—to \$19.00

China Clay†—Imported, car lots—bulk—ton \$11.00 to \$20.00. Pigment clay for rubber—car lots—bags—ton—to \$16.00, less car lots, to \$23.

Kaolin (refined grades) lb. 4 cents—12 cents.

*Engineering and Mining Journal's "Metal and Mineral Markets"—New York, November, 1933.

†Canadian Chemistry and Metallurgy—Toronto, October, 1938.

Table 389.—World Production of China Clay, 1935-1937

(Supplied by Imperial Institute)

(Long tons)

Producing Country and Description	1935	1936	1937
BRITISH EMPIRE			
United Kingdom.....	707,572	746,922	830,946
Union of South Africa.....	226	344	413
Canada.....	152		
Burma.....	133	788	(a)
Federated Malay States.....	91	121	264
India.....	14,302	17,217	17,081
Unfederated Malay States.....	5		30
Australia.....	14,661	35,336	16,688
FOREIGN COUNTRIES			
Austria (exports).....	22,216	19,622	19,537
Belgium (c).....	15,363	18,848	22,538
Bulgaria.....	5,271	1,892	3,492
Czechoslovakia (estimated).....	350,000	400,000	450,000
Denmark—			
Crude.....	34,900	27,700	32,300
Washed and pressed.....	9,800	8,500	9,100
France.....	110,500	122,900	124,450
Germany—			
Bavaria.....	657,205	141,913	157,265
Prussia.....	68,074	76,795	90,521
Saxony—			
Crude.....	47,622	45,855	47,653
Washed.....	44,101	50,298	59,892
Thuringia—			
Sand.....	(a)	5,018	6,392
Greece.....			300
Italy—			
Crude.....	65,407	113,136	130,605
Washed and ground (b).....	5,000	(a)	(a)
Kaolinic earth.....	787	6,017	2,657
Portugal—			
Washed.....	13,236	11,442	10,723
Kaolinic sand.....	340	384	453
Roumania (d).....	13,288	11,130	(a)
Sweden.....	2,712	2,668	2,148
Algeria.....	1,253	2,570	1,634
United States (e).....	467,550	570,481	653,823
Argentina.....	604	426	(a)
Brazil.....	(a)	(a)	1,593
Chile.....	6,807	7,900	(a)
Japan (estimated).....	400,000	400,000	400,000
Korea.....	32,873	24,322	(a)
Netherlands East Indies.....	12	9	771

(a) Information not available.

(b) Derived from crude and stocks.

(c) "Eurite" and kaolin.

(d) Converted from cubic metres at the rate of 1 cubic metre=2 long tons.

(e) Sales of china clay and paper clay.

China clay is also produced in U.S.S.R., China and "Manchoukuo."

Table 390.—Sales and Cost Statistics, by Provinces, Domestic Clay Products Industry, 1935-1937

Province and year	Number of firms	Cost of process supplies used	Cost of fuel and electricity	Net value of sales
		\$	\$	\$
NOVA SCOTIA—				
1935.....	5	906	50,264	219,308
1936.....	5	603	58,773	295,878
1937.....	5	2,514	73,200	331,132
NEW BRUNSWICK—				
1935.....	4	345	10,523	51,610
1936.....	5	480	20,652	81,124
1937.....	5	1,209	26,710	95,957
QUEBEC—				
1935.....	22	29,978	141,901	421,283
1936.....	19	15,967	169,803	505,995
1937.....	19	23,776	247,074	782,303
ONTARIO—				
1935.....	75	25,789	339,248	1,005,188
1936.....	80	46,924	357,874	1,169,138
1937.....	78	66,738	571,058	1,396,049
MANITOBA—				
1935.....	4	125	17,700	56,930
1936.....	4	667	8,813	46,084
1937.....	5	390	14,348	80,793
SASKATCHEWAN—				
1935.....	4	673	10,472	87,005
1936.....	3	776	11,429	83,379
1937.....	5	1,157	13,419	100,754
ALBERTA—				
1935.....	9	2,201	17,027	307,451
1936.....	9	3,533	27,973	284,271
1937.....	10	3,103	30,919	304,616
BRITISH COLUMBIA—				
1935.....	9	566	31,860	184,210
1936.....	8	2,403	39,684	238,804
1937.....	10	4,681	56,027	288,932
Canada—				
1935.....	132	60,583	618,995	2,332,985
1936.....	133	71,353	695,001	2,704,673
1937.....	137	103,568	1,032,755	3,350,536
1926.....	194	(a)	2,080,054	(a)

(a) Information not available.

Table 391.—Capital Employed in the Clay Products Industry in Canada, by Provinces, 1937

Industry and province	Capital employed as represented by:					Total
	Present value of land†	Present value of buildings, fixtures, machinery, tools and other equipment	Inventory value of materials on hand, stocks in process, fuel, etc.	Inventory value of finished products on hand	Operating capital, including cash, bills and accounts receivable, etc.	
BY INDUSTRIES—	\$	\$	\$	\$	\$	\$
*Brick and Tile—						
Nova Scotia.....	119,700	665,784	66,058	68,656	51,196	971,394
New Brunswick.....	28,471	160,916	1,216	23,201	14,683	228,487
Quebec.....	1,298,080	3,808,012	52,035	438,045	314,564	5,910,736
Ontario.....	1,865,930	5,075,582	114,378	907,037	1,409,271	9,372,198
Manitoba.....	15,400	106,240	2,705	18,383	63,821	206,549
Saskatchewan.....	285,418	447,533	15,994	44,967	42,794	836,706
Alberta.....	142,394	1,150,981	63,895	151,894	160,234	1,669,398
British Columbia.....	144,663	525,091	9,955	134,236	78,035	891,980
Total for Canada.....	3,900,056	11,940,139	326,236	1,786,419	2,134,598	20,087,448
Stoneware and pottery—						
Total for Canada.....	45,463	187,543	22,951	31,403	52,424	339,784
BY PROVINCES—						
Total for clay and clay products—						
Nova Scotia.....	119,700	665,784	66,058	68,656	51,196	971,394
New Brunswick.....	28,471	169,312	4,197	29,849	30,629	263,458
Quebec.....	1,298,080	3,808,012	52,035	438,045	314,564	5,910,736
Ontario.....	1,881,515	5,099,582	115,601	913,530	1,429,447	9,439,675
Manitoba.....	15,400	106,240	2,705	18,383	63,821	206,549
Saskatchewan.....	285,418	447,533	15,994	44,967	42,794	836,706
Alberta.....	170,772	1,300,528	82,142	167,056	175,036	1,895,534
British Columbia.....	145,163	530,691	10,455	137,336	79,535	903,180
Canada.....	3,945,519	12,127,682	349,187	1,817,822	2,187,022	20,427,232

* Clay, sewer pipe, firebrick products and other clays included under brick and tile.

† Excluding unmined material.

Table 392.—Employees, Salaries and Wages in the Clay Products Industry in Canada, by Provinces, 1937

Province	*Average number of employees			Salaries and wages		
	Salaried employees	Wage-earners	Total	Salaries	Wages	Total
1937				\$	\$	\$
Nova Scotia.....	10	154	164	22,283	119,471	141,754
New Brunswick.....	9	70	79	11,106	43,586	54,692
Quebec.....	63	469	532	112,496	369,365	481,861
Ontario.....	104	923	1,027	200,917	770,865	971,782
Manitoba.....	6	52	58	14,800	23,908	38,708
Saskatchewan.....	8	35	43	16,370	29,692	46,062
Alberta.....	43	171	214	60,863	126,098	186,961
British Columbia.....	18	152	170	33,056	139,916	172,972
Canada.....	261	2,026	2,287	471,891	1,622,901	2,094,792

* See note page 41.

† Includes 29 female salaried workers.

Table 393.—Average Number of Wage-Earners, by Months, 1926, 1936 and 1937

Month	1926	1936	1937	
			Pit	Plant
January.....	1,936	694	48	843
February.....	1,963	725	46	873
March.....	2,591	727	50	1,100
April.....	3,179	979	137	1,403
May.....	4,188	1,770	345	2,139
June.....	4,695	2,206	419	2,408
July.....	4,686	2,400	465	2,423
August.....	4,505	2,276	485	2,453
September.....	3,950	2,260	424	2,237
October.....	3,790	1,911	369	2,069
November.....	3,273	1,301	302	1,709
December.....	2,714	1,047	113	1,368

2. Products from Imported Clays

This industry covers the operations of the factories in Canada which were occupied chiefly in making ceramic products from imported clays. The commodities made in these plants during 1937 included high tension insulators, enamelled sanitary ware, china tableware, firebricks, wall tile, refractory cements, pottery, and electrical porcelains such as sockets, plugs, etc.

Nineteen plants reported in this group in 1937 and their output valued at \$3,599,181 was 24 per cent higher than last year's total of \$2,906,432, the latter figure in turn being 33 per cent greater than the 1935 total of \$2,174,977. Capital employed in this industry amounted to \$4,457,109 and the average number of workers was 1,218. Salaries and wages amounted to \$1,265,913, the cost of materials used in manufacturing processes was \$971,497, and expenditures for fuel and electricity totalled \$286,499.

Table 394.—Products made in the Imported Clay Products Industry, 1936 and 1937

Products	1936	1937
	Grossselling value at works	Grossselling value at works
Firebrick and stove linings—Rigid.....	\$ 330,602	\$ 395,155
Plastic.....	59,618	80,134
High temperature cements.....	24,961	35,219
High tension porcelain insulators, china sanitaryware, clay sewer pipe, floor and wall tile, pottery, china tableware, etc.....	2,491,251	3,088,673
(Separate figures cannot be shown for these items as there were only one or two producers in each case).		
Total.....	2,906,432	3,599,181

NOTE:—Clay firebrick, floor tile, sewer pipe and pottery are also made in Canada from domestic clays (see tables 374).

Table 395.—Materials used in the Imported Clay Products Industry, 1936 and 1937

Material	1936		1937	
	Short tons	Total cost at works	Short tons	Total cost at works
Imported clays—Ball clay.....	2,449	\$ 41,438	3,701	\$ 62,119
China clay.....	2,894	44,942	3,321	66,361
Fireclay.....	21,593	124,623	26,242	151,932
Saggar clay.....	586	4,467	918	9,096
Other imported clays.....	2,092	14,473	1,704	14,175
Canadian clays.....	1	11	2,692	3,870
Feldspar.....	1,572	28,521	2,428	46,068
Silica and ground quartz.....	2,305	26,722	3,032	44,648
Talc.....			110	1,460
Other glazing materials.....	21	11,596		17,461
Insulator hardware.....		117,663		263,093
Shipping containers and packing materials.....		59,797		73,510
All other materials.....		234,323		217,704
Total.....		708,576		971,497

LIME

Production of quick and hydrated lime during 1937 by Canadian producers totalled 549,353 short tons valued at \$3,824,917 compared with 468,401 tons at \$3,335,970 in the preceding year. The tonnage as recorded represents both sales and consumption of lime by producers and the output in 1937 as thus defined was the largest since the all time high record of 674,087 tons in 1929. Of the total 1937 lime production 466,538 short tons valued at \$3,252,383 represented quicklime and 82,815 short tons at \$572,534, hydrated lime. Ontario and Quebec are Canada's largest lime producing provinces, the output in these provinces during 1937 being respectively 294,467 short tons worth \$2,152,644 and 156,313 tons at \$909,116.

The consumption of lime as a chemical in industrial plants and processes has been increasing rapidly during recent years. In 1937 statistical returns made by the Canadian lime industry revealed that 466,796 short tons of lime valued at \$3,112,147 were shipped as chemical to smelters, steel mills, calcium carbide plants, gold mines, pulp and paper mills, glass works and various other consumers. Of the quantity used in such plants during 1937, the pulp and paper mills absorbed 132,045 short tons, iron and steel mills 43,790 tons, gold mines 37,209 tons and sugar refineries 11,625 tons.

The prices per ton for quick and hydrated lime in 1937 were respectively \$6.97 and \$6.45 as compared with \$8.25 and \$11.81 in 1927.

The number of Canadian lime firms reported as active in 1937 totalled 52, of which 21 were located in the province of Quebec and 16 in Ontario. The remainder of the firms comprising the industry conducted lime burning operations in Nova Scotia, New Brunswick, Manitoba, Alberta and British Columbia. Capital employed by the entire industry in 1937 was reported at \$4,931,831; employees totalled 872, salaries and wages distributed aggregated \$781,274; \$871,131 were expended for fuel and electricity and the cost of explosives and various other process supplies was recorded at \$167,827.

Imports of lime into Canada during 1937 totalled 10,033,100 pounds valued at \$32,379 as compared with 1,876,300 pounds at \$12,036 in 1936. Exports of lime during 1937 amounted to 20,746,700 pounds appraised at \$85,489 compared with 23,322,800 pounds at \$97,574 in the preceding year.

Hydrated or specially prepared slake lime is marketed in the form of fine powder usually in 50 pound multi-wall paper bags. Quick lime is sold in the lump, pebble, crushed and pulverized forms. Lump lime and pebble lime are sold in bulk or packed in barrels; crushed lime (1 inch and under) and pulverized lime (ground to minus 20 mesh and in some plants to minus 50 mesh) are sold in airtight, multi-wall paper bags.

According to a report (No. 791) issued by the Bureau of Mines, Ottawa, the outlook for the lime industry is promising because of the increasing number of uses for lime, and because of the increase in lime-using industries in Canada. The feasibility of recovering the carbon dioxide gas resulting from the calcination of lime, now allowed to go to waste in most commercial lime plants, is engaging the attention of lime manufacturers. It has been reported that a lime company in Australia is now producing both liquid and solid carbon dioxide as by-products.

Table 396.—Production of Lime in Canada, 1928-1937

Year	Short tons	Value†	Year	Short tons	Value†
		\$			\$
1928.....	508,889	4,534,568	1933.....	323,540	2,432,306
1929.....	674,087	5,908,610	1934.....	368,113	2,745,797
1930.....	490,802	4,038,698	1935.....	405,419	2,925,791
1931.....	344,785	2,764,415	1936.....	468,401	3,335,970
1932.....	320,650	2,394,537	1937.....	549,353	3,824,917

† Gross.

Table 397.—Production of Lime in Canada, by Provinces, 1937, Showing Purposes for which used (*) or Sold

	Nova Scotia and New Brunswick	Quebec	Ontario	Manitoba and Alberta	British Columbia	Canada
QUICKLIME (1 ton—2,000 pounds—values gross)						
Building trades—						
Finishing lime..... ton.....		1	598	2,694		3,293
\$		8	5,598	25,435		31,041
Masons' lime..... ton.....	880	4,206	6,494	1,764		13,344
\$ 7,161	42,003	46,864	15,174			111,202
Sand-lime brick..... ton.....		1,131	6,144			7,275
\$		5,093	41,151			46,244
Agriculture..... ton.....	589	3				592
\$ 4,379	31					4,410
Chemical—						
Smelters..... ton.....		1,696	996	795		3,487
\$		17,872	6,163	7,951		31,986
Iron and steel furnaces (a)..... ton.....	18,739	201	14,702	3,840	558	35,040
\$ 158,087	1,822	102,925	30,723	2,522		296,079
Cyanide mills (gold mines)..... ton.....	75	2,893	31,204	1,415	727	36,314
\$ 750	20,035	199,188	18,241	5,038		243,252
Pulp and paper mills..... ton.....	6,940	59,218	8,006	10,212	14,176	98,552
\$ 51,609	308,854	47,343	69,512	90,982		568,300
Glass works..... ton.....			7,612	75		7,687
\$			53,098	795		53,893
Sugar refineries..... ton.....	250	49	4,035	7,179		11,513
\$ 2,250	522	43,434	59,585			105,791
Tanneries..... ton.....		264	3,076			3,340
\$		2,615	21,012			23,627
Fertilizers..... ton.....			286			286
\$			2,288			2,288
Insecticides..... ton.....			909		120	1,029
\$			6,499		542	7,041
Other chemical works..... ton.....		42,028	179,229	362		221,619
\$		332,736	1,254,690	2,899		1,590,225
Uses unspecified..... ton.....	1,446	5,053	4,727	140	7,218	18,584
\$ 11,568	37,529	41,891	1,934	32,625		125,547
Other consumers..... ton.....		1,297	286			1,583
\$		9,096	2,361			11,457
Total Quicklime..... ton.....	28,919	118,040	268,304	28,476	22,799	466,538
\$	235,804	778,216	1,874,405	232,249	131,709	3,252,383
HYDRATED LIME						
Building trades—						
Finishing lime..... ton.....			10,740	4,618		15,358
\$			123,009	73,695		196,704
Masons' lime..... ton.....	275	448	3,606			4,329
\$ 2,465	2,246	29,158				33,869
Sand-lime brick..... ton.....						
\$						
Agriculture..... ton.....	655	652	1,234		2,700	5,221
\$ 5,900	3,940	12,282			12,204	34,326
Chemical—						
Smelters..... ton.....		325	300		728	1,353
\$		1,625	3,417		3,290	8,332
Iron and steel furnaces..... ton.....		5,715	35			5,750
\$		17,915	368			18,283
Cyanide mills..... ton.....		670	215		10	895
\$		3,350	2,470		45	5,865
Pulp and paper mills..... ton.....	6,925	26,295	273			33,493
\$ 48,500	73,922	2,870				125,292
Glass works..... ton.....						
\$						
Sugar refineries..... ton.....	5	107				112
\$ 43	853					896
Tanneries..... ton.....		456	378			834
\$		3,388	4,025			7,413
Fertilizers..... ton.....	353	205	40			598
\$ 3,883	1,230	420				5,533
Insecticides..... ton.....			30		19	49
\$			295		86	381
Other chemical works..... ton.....		898	793	154		1,845
\$		6,261	8,710	2,699		17,670
Uses unspecified..... ton.....	444	1,341	8,427		1,483	11,695
\$ 3,552	10,390	90,050			6,703	110,695
Other consumers..... ton.....	30	1,161	92			1,283
\$ 330	5,780	1,165				7,275
Total Hydrated Lime..... ton.....	8,667	38,273	26,163	4,772	4,940	82,845
\$	64,673	130,900	278,239	76,394	22,328	572,534
Grand Total..... ton.....	37,586	156,313	294,467	33,248	27,739	549,333
\$	300,477	909,116	2,152,644	308,643	154,937	3,824,917

(a) Includes calcined dolomite used as a refractory material.

(*) Not necessarily consumed in provinces where produced.

Table 398.—Lime Sold or Used for Chemical and Other Purposes in Canada, 1930-1937

Year	Lime Sold or used for chemical purposes		Lime sold or used for building or other non-chemical purposes	
	short tons	\$	short tons	\$
1930.....	351,443	2,596,112	139,359	1,442,586
1931.....	231,837	1,637,319	112,948	1,127,098
1932.....	255,472	1,758,898	65,178	635,639
1933.....	235,810	1,664,946	87,730	767,360
1934.....	229,906	1,598,906	138,207	1,146,891
1935.....	260,885	1,775,657	144,534	1,150,134
1936.....	(b) 389,324	2,670,266	79,077	665,704
1937.....	(c) 466,796	3,112,147	82,557	712,770

(a) Compiled by McLean Building Reports Ltd.

(b) 349,940 shorts tons quicklime; 39,384 short tons hydrated lime.

(c) 421,867 tons quicklime and 44,929 short tons hydrated lime.

Table 399.—Imports into Canada and Exports of Lime and Various Lime Compounds, 1936 and 1937

		1936		1937	
		Quantity	Value	Quantity	Value
			\$		\$
IMPORTS—					
Lime.....	Cwt.	18,763	12,036	(a) 100,331	32,379
Calcium chloride in packages of not less than 25 pounds.....	lb.	638,400	5,778	877,000	7,611
Calcium chloride in packages of less than 25 pounds.....	lb.	197	57	816	439
Calcium chloride not in solution for road treating purposes.....	lb.	24,053,800	227,429	6,621,600	61,689
Calcium arsenate.....	lb.	276,552	16,372	71,168	4,305
Chloride of lime and hypochlorite of lime in packages not less than 25 pounds.....	lb.	1,010,100	30,527	627,000	26,625
Chloride of lime and hypochlorite of lime in packages of less than 25 pounds.....	lb.	46,654	5,463	45,858	5,369
EXPORTS—					
Lime.....	Cwt.	233,328	97,574	207,467	85,489
Acetate of lime.....	Cwt.	63,550	83,620	34,415	48,906

(a) All from the United States.

Cwt.=100 pounds.

Table 400.—Number of Firms, Employees, Salaries and Wages and Net Value of Lime (Quick and Hydrated) Sold or Used, by Provinces, 1937

Province	Number of firms	Number of employees		Salaries and wages	Fuel, electricity and process supplies used	Production Net value
		Salaried employees	Wage-earners			
				\$	\$	\$
1937						
New Brunswick(†).....	6	9	123	128,221	69,030	231,447
Quebec.....	21	24	266	245,857	283,864	625,252
Ontario.....	16	22	228	269,793	491,578	1,661,066
Manitoba.....	3	6	91	67,635	87,952	127,213
Alberta.....	3	3	19	26,727	25,403	68,075
British Columbia.....	3	10	71	43,041	81,131	72,906
Canada.....	52	74	798	781,274	1,038,958	2,785,959

† Includes data for two firms operating in Nova Scotia.

Table 401.—Capital Employed in the Lime Industry in Canada, by Provinces, 1937

Province	Capital employed as represented by:					Total
	Present cash value of land	Present value of buildings, fixtures, machinery, tools and other equipment	Inventory value of stone on hand, fuel and miscellaneous supplies on hand	Inventory value of finished products on hand	Operating capital (cash bills and accounts receivable, prepaid expenses, etc.)	
	\$	\$	\$	\$	\$	\$
New Brunswick*	83,877	101,500	16,430	9,385	24,250	235,442
Quebec	411,569	706,751	99,139	3,661	253,324	1,471,444
Ontario	106,038	1,489,634	195,577	7,117	19,215	1,817,581
Manitoba	20,000	543,625	23,419	14,027		601,071
Alberta	25,000	143,175	6,172	6,222	29,085	209,654
British Columbia	5,000	309,175	60,761	12,745	205,958	593,639
Canada	651,484	3,293,860	401,498	53,157	531,832	4,931,831

*Includes data for 2 firms in Nova Scotia.

Table 402.—Number of Wage-Earners on Payroll or Time Record on the 15th of Each Month or Nearest Representative Date, 1937

Month	Quarry	Kiln	Month	Quarry	Kiln
January	235	397	July	327	565
February	251	434	August	328	511
March	269	429	September	308	560
April	305	483	October	284	590
May	323	540	November	273	548
June	328	550	December	250	440

SAND AND GRAVEL

Commercial production of sand and gravel in Canada during 1937 totalled 27,001,301 short tons valued at \$10,492,696, or an increase of 22.04 per cent in tonnage and 51.60 per cent in value over the corresponding output in 1936. The quantity of these materials produced during the year under review was the greatest since the all-time high record output of 28,547,511 tons in 1930. The value of the 1937 production has, however, never been surpassed in the history of this particular Canadian industry.

The foregoing figures of commercial production include the material derived from all sources, including that recovered by dredging; also included is the tonnage used as railway ballast. Of the total 1937 output in the Dominion, 9,476,000 short tons valued at \$2,637,495 originated in the province of Quebec, 8,832,526 tons at \$3,613,854 in Ontario and lesser quantities in the other provinces.

In 1937, shipments of screened or washed sand and gravel totalled 3,522,387 short tons compared with corresponding shipments of 3,254,222 short tons in 1936. Production of bank or pit-run material in 1937 amounted to 23,478,914 short tons, or an increase of 24.43 per cent above the output of similar products in the preceding year. In 1936, for the first time, the quantity and value of natural sand and gravel specially excavated and used for backfilling in certain metal mines were included with the statistics pertaining to the Canadian sand and gravel industry.

During the year under review, 2,764,639 short tons of sand and gravel were utilized as railway ballast and 19,453,188 short tons consumed in concrete and highway construction. In the same period producers' shipments of moulding and core sands amounted to 101,790 short tons valued at \$46,071, while production of "straight" sand, washed and pit-run, for building and various other purposes totalled 1,356,269 short tons worth \$476,824.

The number of operators reporting production of sand and gravel in 1937 totalled 1,560; capital employed amounted to \$6,706,288 and \$3,468,471 were distributed by the industry to 6,084 employees.

Imports of silica sand and silex (crystallized quartz) in 1937 amounted to 217,116 short tons valued at \$477,700 and in the same year imports of sand and gravel, n.o.p., totalled 132,460 short tons appraised at \$97,607. Exports of sand and gravel from Canada during 1937 totalled, 364,270 short tons worth \$78,441 compared with 333,438 short tons at \$73,624 in 1936.

A general investigation regarding moulding sand (natural bonded) was recently made and the results of this were published in 1936 by the Bureau of Mines, Department of Mines and Resources, Ottawa, in report No. 767—Natural Bonded Moulding Sands of Canada. The report draws attention to the large number of deposits from which supplies have been obtained for local foundries and the probability of replacing imported material with Canadian sands. Small quantities of moulding sands, not tabulated in official records, are produced in nearly all the provinces by foundrymen for their own use from nearby deposits. Silica sands without clay bond are not included with data relating to the sand and gravel industry; these natural silica sands together with crushed or pulverized quartz or quartzite are classified as quartz or silica and as such are recorded as products of the "Feldspar and Quartz Mining Industry."

"An important source of income to New Jersey magnetic iron-ore mining companies is the sale of graded rock and sand tailings, notes B. F. Tillson, Jr., in a recent article in *Mining and Metallurgy* (March, 1938). Mill tailings at one property are used for cleaning coal by the Chance process. At another mine, rock and sand products are sold in large variety, including not only crushed stone and sand for highway and concrete but also several sizes of poultry grit, filter sand, foundry sand, and sand for roofing shingles and for coal cleaning. All this calls for careful classification of tailing. Several thousand tons of rock and sand are shipped each month by truck, as well as large amounts by rail." (United States Bureau of Mines.)

According to the "Minerals Yearbook" of the United States Department of Mines, an arrangement was made in 1937 by the National Sand and Gravel Association with the University of Maryland for conducting research. This expansion of research facilities will aid the sand and gravel industry in meeting problems of production and utilization of its products. Among the projects listed for early investigation in the new laboratory are: adhesion of bitumens to aggregates of varying composition and texture, effect of particle shape on stability and durability of bituminous mixtures, relation of aggregates to fatigue of concrete, methods of identifying and evaluating the effects of aggregate particles considered harmful to concrete and bituminous mixes, and a nation-wide survey of aggregate characteristics to provide bases for specifications in different localities.

Table 403.—Production (*) of Sand and Gravel in Canada, 1928-1937

Year	Tons	\$	Year	Tons	\$
1928.....	28,102,917	5,809,431	1933.....	11,738,823	4,464,285
1929.....	27,846,945	7,317,814	1934.....	14,854,159	4,035,477
1930.....	28,547,511	8,344,913	1935.....	21,213,489	6,389,440
1931.....	21,748,586	6,651,165	1936.....	22,124,160	6,921,399
1932.....	14,469,942	4,480,596	1937.....	27,001,301	10,492,696

(*) Does not include production of natural silica sand or of silica sand manufactured from quartz or silica rock; production of these are recorded under quartz. Also does not include natural sand used for back filling at mines prior to 1936.

Table 404.—Production in Canada, Imports and Exports of Sand and Gravel, 1936-1937

Kind	1936			1937		
	Washed or screened	Bank or pit-run	Total value	Washed or screened	Bank or pit-run	Total value
	Tons	Tons	\$	Tons	Tons	\$
PRODUCTION—						
Sand—						
Moulding sand.....	1,187	15,538	16,951	77,706	22,962	44,551
Building sand and sand for concrete, roadwork, etc.....	552,691	403,811	362,542	860,555	495,714	476,824
Core sand.....		961	1,457	855	267	1,520
Other sand (including blast and engine sands).....	2,328	11,807	4,338	10,648	47,237	11,567
Sand and gravel—						
Sand and gravel for railway ballast.....	202,162	6,116,519	1,054,703	270,724	2,493,915	533,876
Sand and gravel for concrete roads, etc.....	2,378,792	11,957,848	5,216,942	1,847,871	17,605,317	8,340,764
Mine filling.....		(a)	(a)		1,170,260	146,811
Crushed gravel.....	117,062	363,454	264,466	454,028	1,643,242	936,783
Total.....	3,254,222	18,869,938	6,921,399	3,522,387	23,478,914	10,492,696
	Tons		\$	Tons		\$
IMPORTS—						
Sand, silica, for glass and carborundum manufacture, etc.....	143,611		270,824	212,840		373,760
Sand and gravel, n.o.p.....	121,937		77,668	132,460		97,607
Total.....	265,548		348,492	345,300		471,367
EXPORTS.....	333,438		73,624	364,270		78,441

NOTE.—Production includes all classes of sand and gravel other than natural silica sand or silica sand manufactured from quartz or silica rock; production of these is recorded under quartz.

(a) Included with sand and gravel for concrete, roads etc.

Table 405.—Production of Sand and Gravel in Canada, by Railway Operators, 1936-1937

Kind	1936		1937	
	Tons	Value	Tons	Value
		\$		\$
Sand—				
Moulding sand.....			90	135
Building sand and sand for concrete, roads, etc.....	1,000	136	22,891	3,681
Other sand (including blast and engine sands).....	8,857	1,648	43,340	6,604
Sand and gravel—				
Sand and gravel for railway ballast.....	5,876,997	910,302	2,369,753	392,511
Sand and gravel for concrete, roads, etc.....	155,901	30,004	241,325	36,410
Crushed gravel.....				
Total.....	6,042,755	942,090	2,677,399	439,341

Table 406.—Production of Sand and Gravel in Canada, by Operators Other than Railways, 1936-1937

Kind	1936			1937		
	Washed or screened	Bank or pit-run	Value	Washed or screened	Bank or pit-run	Value
	Tons	Tons	\$	Tons	Tons	\$
Sand—						
Moulding sand.....	1,187	15,538	16,951	77,706	22,872	44,416
Building sand and sand for concrete, roads, etc.....	552,691	402,811	362,406	860,555	472,823	473,143
Core sand.....		961	1,457	855	267	1,520
Other sand (including blast, and engine sands).....	2,328	2,950	2,690	10,648	3,897	4,963
Sand and gravel—						
Sand and gravel for railway ballast.....	202,162	239,522	144,401	270,724	124,162	141,365
Sand and gravel for concrete, roads, etc.....	2,378,792	11,801,947	5,186,938	1,847,871	17,363,992	8,304,354
Mine filling.....		(a)	(a)		1,170,260	146,811
Crushed gravel.....	117,062	363,454	264,466	454,028	1,643,242	936,783
Total.....	3,254,222	12,827,183	5,979,309	3,522,387	20,801,515	10,053,355

(a) Included with sand and gravel for concrete, roads, etc.

Table 407.—Production of Sand for Building and Concrete, Roads, Etc., and Sand and Gravel for Railway Ballast and for Concrete, Roads, Etc., 1931-1937

Year	Sand		Sand and gravel			
	For building, concrete, roads, etc.		For railway ballast		For concrete, roads, etc.	
	Tons	\$	Tons	\$	Tons	\$
1931.....	3,189,428	1,069,210	3,593,451	459,531	14,352,283	4,784,298
1932.....	2,368,304	745,091	2,097,224	324,648	9,604,113	3,181,105
1933.....	775,412	218,559	561,538	110,449	9,957,832	3,907,911
1934.....	686,631	209,002	1,454,618	266,292	12,418,408	3,411,751
1935.....	787,412	264,435	2,267,195	415,092	17,531,047	5,357,331
1936.....	956,502	362,542	6,318,681	1,054,703	14,336,640	5,216,942
1937.....	1,356,269	476,824	2,764,639	533,876	19,453,188	8,340,764

Table 408.—Production of Sand and Gravel in Canada, by Provinces, 1936-1937

Kind	Nova Scotia	New Brunswick	Quebec	Ontario	Manitoba	Saskatchewan	Alberta	British Columbia
1936								
Sand—								
Moulding sand.....tons				15,765	960			
Building sand and sand for concrete, roadwork, etc.....tons				16,303	648			
Core sand.....tons	10,800	30,730	547,713	267,378	24,959	162	1,577	73,183
Other sand (including blast sand, engine sand, etc.).....tons	\$ 4,000	\$ 5,663	\$ 201,804	119,294	10,793	120	628	20,240
Sand and gravel—								
*Sand and gravel for railway ballast.....tons				1,233	224			
*Sand and gravel for concrete, roads, mine filling, etc.....tons		851	6,499	6,785				
Crushed gravel.....tons		225	1,285	2,828				
Total.....*tons	1,947,471	970,945	5,490,280	8,498,153	1,852,606	716,910	894,380	1,753,415
Gross value.....\$	941,366	567,797	1,418,231	2,227,620	545,130	284,531	339,925	596,796
1937								
Sand—								
Moulding sand.....tons			1,756	98,498	414			
Building sand and sand for concrete, roadwork, etc.....tons			1,580	42,596	375			
Core sand.....tons	19,408	12,659	811,167	415,496	21,707	1,989	1,085	72,758
Other sand (including blast sand, engine sand, etc.).....tons	\$ 3,080	\$ 4,754	\$ 259,398	174,811	8,340	1,450	424	24,567
Sand and gravel—								
*Sand and gravel for railway ballast.....tons				855	267			
*Sand and gravel for concrete, roads, etc.....tons				1,282	238			
Crushed gravel.....tons		1,498	8,538	15,462			28,276	4,111
Total.....tons	2,992,429	1,136,013	9,476,000	8,832,526	1,380,957	822,447	711,966	1,648,963
Gross value.....\$	1,457,266	715,652	2,637,495	3,613,854	551,464	470,343	312,687	733,935

* Includes 17,975 tons railway ballast valued at \$2,663 and 49,000 tons for concrete, road building, etc., valued at \$25,000—produced in Prince Edward Island.

† Back filling at Sullivan mine not recorded.

Table 409.—Cost of Fuel, Electricity and Process Supplies and Net Value of Production, in 1937

Province	No. of operators	Cost of fuel and electricity used	Cost of process supplies used	Net value of production
	\$	\$	\$	\$
Nova Scotia.....	6	(a)	.....	1,457,266
New Brunswick.....	7	(a)	.....	715,652
Quebec.....	1,017	32,710	7,980	2,596,805
Ontario.....	471	169,909	33,739	3,410,206
Manitoba.....	15	8,899	.....	542,565
Saskatchewan.....	13	1,141	14,110	455,092
Alberta.....	9	(a)	.....	312,587
British Columbia.....	22	19,510	7,350	707,075

Table 410.—Capital Employed in the Sand and Gravel Industry in Canada, by Provinces, 1937

	Capital employed as represented by:					Total
	Present cash value of the land*	Present value of buildings, fixtures, machinery, tools and other equipment	Inventory value of materials on hand, stocks in process, fuel and miscellaneous supplies on hand	Inventory value of finished products on hand	Operating capital (cash, bills and accounts receivable, prepaid expenses, etc.)	
	\$	\$	\$	\$	\$	\$
Nova Scotia.....	(a)	(a)	(a)	(a)	(a)	(a)
New Brunswick.....	5,000	(a)	(a)	(a)	(a)	5,000
Quebec.....	89,020	90,703	7,930	14,350	30,118	232,121
Ontario.....	356,330	4,529,590	12,986	84,477	290,355	5,273,738
Manitoba.....	343,702	115,071	2,002	27,577	167,207	655,559
Saskatchewan.....	(a)	(a)	(a)	(a)	(a)	(a)
Alberta.....	2,000	17,683	1,165	.....	2,926	23,774
British Columbia.....	175,895	292,008	2,459	6,880	38,854	516,096
Canada.....	971,947	5,045,055	26,542	133,284	529,460	6,706,288

* Excluding unmined materials.

(a) Not available.

† Includes value of dredges.

Table 411.—Employees, Salaries and Wages in the Sand and Gravel Industry, by Provinces, 1937

Province	Average number of employees			Salaries and wages		
	Salaried employees	Wage-earners	Total	Salaries	Wages	Total
				\$	\$	\$
Nova Scotia.....	.....	391	391	.....	306,217	306,217
New Brunswick.....	.....	1,510	1,510	.....	312,704	312,704
Quebec.....	8	2,266	2,274	7,930	1,587,916	1,595,846
Ontario.....	62	403	465	75,340	332,897	408,237
Manitoba.....	12	637	649	28,478	289,827	318,305
Saskatchewan.....	1	397	398	300	237,244	237,544
Alberta.....	1	289	290	5,752	177,658	183,410
British Columbia.....	16	91	107	24,656	81,552	106,208
Canada.....	100	5,984	6,084	112,456	3,326,015	3,468,471

Table 412.—Average Number of Wage-Earners, by Months, 1935-1937

Month	1935	1936	1937
January.....	122	186	280
February.....	116	169	265
March.....	138	221	305
April.....	1,088	315	1,885
May.....	6,117	4,502	8,514
June.....	6,664	8,703	14,961
July.....	6,754	8,785	15,153
August.....	6,806	5,067	11,503
September.....	4,988	4,656	11,507
October.....	1,483	1,319	4,893
November.....	544	420	2,026
December.....	406	256	434

SAND-LIME BRICK INDUSTRY

Only 5 factories in Canada manufactured sand-lime building brick during 1937, 4 in Ontario and 1 in Quebec. The value of products made in these works, including brick, building blocks and some ready-mixed mortar, was \$197,921 in 1937 compared with \$189,668 for the same works in 1936.

Output of sand-lime brick in 1937 was reported at 11,363 M valued at \$125,880 at factory prices, a slight decline in quantity but an increase in value when compared with the 1936 production of 11,456 M at \$119,707. Production of sand-lime building blocks increased to 851 M at \$67,091 from 573 M at \$55,411 in 1936.

The average number of employees in this industry during 1937 was 81, including 15 on salaries and 66 on wages. The number of wage-earners fluctuated from 38 in January to 83 in May, 77 in September, and 48 in December. Payments for salaries and wages totalled \$72,219 in 1937, as against \$71,021 in 1936.

Table 413.—Products, 1936-1937

Products	1936		1937	
	Quantity	Selling value at works	Quantity	Selling value at works
		\$		\$
Sand-lime brick..... M	11,456	119,707	11,363	125,880
Sand-lime building blocks..... M	573	55,411	851	67,091
Other products (*).....		14,550		4,950
Total		189,668		197,921

(*) Includes cinder blocks and ready-mixed concrete.

Table 414.—Materials Used in Manufacturing, 1936 and 1937

Materials	Unit of measure	1936		1937	
		Quantity	Cost at works	Quantity	Cost at works
			\$		\$
Quicklime.....	ton	3,853	32,512	4,812	34,161
Sand.....	cu. yd.	34,519	23,486	39,463	29,124
Total			55,998		63,285

THE STONE INDUSTRY IN CANADA

Including (1) the Stone Quarrying Industry and (2) the Monumental and Ornamental Stone Industry

The Stone Industry in Canada comprises two main divisions:—1.—**The Stone Quarrying Industry**, including quarries and dressing works operated in conjunction with quarries, and 2. **The Monumental and Ornamental Stone Industry**, comprising the operations of firms having no quarries but who operate dressing works where stone for building and monumental purposes is cut, polished or otherwise finished. In the Census of Industry, statistics on the stone quarrying industry are included under mining, while statistics of the monumental and ornamental stone industry are included under manufacturing. For convenience, this report carries data for both of these industries.

These two major divisions, constituting the Canadian stone industry, represented a capital investment of \$18,070,968 in 1937. Production during the year totalled \$9,045,508 which figure includes the value of the quarry output and the value added by manufacturing in the secondary stone industry. Salaried employees and wage-earners employed in 1937 numbered 4,057 and their combined earnings amounted to \$3,928,910.

The two industries are treated separately in the following review.

1. PRIMARY PRODUCTION—THE STONE QUARRYING INDUSTRY

The kinds of stone quarried in Canada include granite (trap rock, syenite and other igneous rock), limestone, marble, sandstone, and slate. Stone of almost every known variety occurs in Canada; rocks of the igneous areas of British Columbia, Manitoba, Ontario, Quebec and the Maritime Provinces exhibit a wide range of physical characteristics, some varieties being especially noted for their richness of colour and beauty of crystallization. The sedimentary rocks, including limestones, sandstones and marbles are quarried at various points in Canada. The products from quarries operating in these different formations not only yield high class structural and decorative materials but provide the chemical and other allied industries with many of their increasing requirements.

Canadian production of stone in 1937, including all varieties, totalled 6,935,612 short tons valued at \$6,939,360 compared with 4,982,912 tons at \$5,134,153 in 1936 and 9,994,656 tons worth \$13,037,209 in 1930. The value of output during the year under review was the greatest since 1932, an increase that particularly reflects a revival in construction and the recent expansion in output by the chemical and metallurgical industries.

Of all primary stone shipped in 1937, limestone, at 5,542,806 short tons, comprised 79.9 per cent; granite at 1,135,099 tons, 16.4 per cent; sandstone at 235,165 tons, 3.4 per cent and marble 21,642 tons or 0.3 per cent.

Quebec and Ontario are the two largest stone-producing provinces and each, in 1937, reported commercial shipments of granite, limestone, marble, sandstone and slate. Of the total quantity of stone produced in the Dominion during 1937 the quarries of Quebec and Ontario contributed 28.2 and 60.9 per cent respectively. Limestone was quarried in every province except Prince Edward Island and Saskatchewan, granite in all but Prince Edward Island, Saskatchewan and Alberta, and sandstone in all but Prince Edward Island, Manitoba and Saskatchewan. Marble was produced in Quebec and Ontario and a relatively small tonnage of slate in Quebec, Ontario and British Columbia.

In 1937 quarry operators reported shipments of 49,098 tons of various building stone (not including monumental or ornamental stone) valued at \$746,370 as against 42,335 tons at \$714,616 in 1936 and 173,204 tons at \$4,184,778 in 1930. Producers' shipments of stone for chemical purposes in 1937, at 693,947 tons valued at \$626,297, established an all-time high record in the Canadian stone industry. Of the limestone sold for chemical purposes, 199,433 tons were consigned to pulp and paper mills, 345,742 tons to iron and steel plants and smelters, and 28,902 tons to sugar refineries. During 1937 agriculture absorbed 112,628 tons of limestone and marble valued at \$131,071, while 1,497,655 tons of different kinds of stone, chiefly limestone, were used for concrete aggregate, and 3,169,136 tons as road metal. The tonnage of granite (trap), limestone and sandstone used for railroad ballast totalled 642,248 in 1937.

Imports into Canada of stone, and certain manufactures thereof, were appraised at \$1,151,373 in 1937 as compared with \$864,952 in the preceding year. Some of the more important import items recorded for 1937 included refuse stone at 592,593 short tons valued at \$348,319; 11,991 tons of whiting at \$126,015; 1,587 grindstones at \$157,699; 1,015 tons mineral wool at \$81,050; and rough granite worth \$80,273. Exports of crushed and other stone from Canada during 1937 were evaluated at \$250,593 as against \$106,870 in 1936.

The number of firms reported as active in the Canadian stone quarrying industry totalled 418 in 1937 and their activities were distributed amongst the different provinces as follows: Nova Scotia 26, New Brunswick 9, Quebec 184, Ontario 163, Manitoba 6, Alberta 3, and British Columbia 27. Capital employed by the industry amounted to \$12,857,537, employees totalled 2,898, salaries and wages paid aggregated \$2,576,344, and the value of fuel, purchased electricity, explosives and various process supplies consumed was computed at \$1,085,548.

Canadian-United States Trade Agreement 1938

The following data prepared by the United States Tariff Commission show the former and new rates of duty on Canadian stone imported into the United States. The new rates were established under the trade agreement signed November 17, 1938, between the United States and Canada:—

Limestone, not suitable for monumental or building stone, crude; under 1935 agreement 2½ cents per 100 pounds; under new agreement 2½ cents per 100 pounds; the value of these imports, all from Canada, was \$4,492 in 1937. Stone, not specially provided for, ground or crushed, except Cornwall stone and marble chip (granite); under new agreement 15 per cent; under 1935 agreement 30 per cent; data relating to these particular imports from Canada during 1937 are not available.

Stone and sand, burrstone, in blocks, rough or unmanufactured; quartzite; traprock; rottenstone; tripoli and sand, crude or manufactured; silica; cliff stone, freestone, granite, and sandstone, unmanufactured, and not suitable for use as monumental, paving, or building stone, all the foregoing, not specially provided for; bound (guaranteed against imposition of duty) on the free list under new agreement; total of these imports in 1937 from all countries was \$419,468 and from Canada, \$360,063.

Table 415.—Production (Sales) of Stone from Canadian Quarries, by Kinds and by Provinces, 1936 and 1937

Province	Granite	Limestone	Marble	Sandstone	Slate	Total
	(a)	(b)				
1936						
Nova Scotia..... tons	66,507	20,860		167,205		254,572
	\$ 99,855	36,365		239,109		375,329
New Brunswick..... tons	1,485	53,781		4,165		59,431
	\$ 73,784	55,564		4,410		133,758
Quebec..... tons	137,912	1,265,243	17,866	92,228	803	1,514,052
	\$ 429,283	1,053,547	138,294	102,388	855	1,729,367
Ontario..... tons	492,227	2,205,992	4,765	3,436	260	2,706,680
	\$ 582,603	1,773,764	29,204	10,805	2,080	2,398,456
Manitoba..... tons	185	49,261	60			49,506
	\$ 2,038	69,837	90			71,965
Alberta..... tons		13,876		40		13,916
	\$	26,188		3,200		29,388
British Columbia..... tons	243,427	122,535	175	18,434	184	384,755
	\$ 131,750	123,607	2,110	135,944	2,479	395,890
Canada..... tons	941,743	3,731,348	22,866	285,508	1,247	4,982,912
	\$ 1,319,313	\$ 3,143,872	169,698	495,856	5,414	5,134,153
1937						
Nova Scotia..... tons	16,430	24,398		137,893		178,721
	\$ 50,966	35,914		192,218		279,098
New Brunswick..... tons	936	51,929		4,603		57,468
	\$ 74,961	55,600		8,480		139,041
Quebec..... tons	218,743	1,653,556	14,957	70,726	414	1,958,396
	\$ 611,125	1,474,653	61,348	65,424	471	2,213,021
Ontario..... tons	625,160	3,582,175	6,685	8,680	300	4,223,000
	\$ 769,860	2,841,469	27,247	22,934	2,258	3,663,768
Manitoba..... tons	138	41,053				41,191
	\$ 1,796	63,432				65,228
Alberta..... tons		13,182		43		13,225
	\$	24,935		2,254		27,189
British Columbia..... tons	273,692	176,513		13,220	186	463,611
	\$ 318,725	177,939		52,561	2,790	552,015
Canada..... tons	1,135,099	5,542,806	21,642	235,165	900	6,935,612
	\$ 1,827,433	\$ 4,673,942	88,595	343,871	5,519	6,939,360

NOTE:—Not included in the above limestone statistics are 1,180,358 tons of limestone consumed in the cement industry in 1936 and 1,465,168 tons in 1937. Limestone used in the Canadian lime industry is also not included; it is estimated that approximately 800,000 tons of limestone were burned in the manufacture of lime in 1936 and about 980,000 tons in 1937.

(a) All igneous rocks included.

(b) Includes dolomite, also marl for agricultural purposes.

Table 416.—Production* of Stone in Canada, by Provinces, Showing Purposes for which Used, 1937 (a)

Item	Nova Scotia	New Brunswick	Quebec	Ontario	Manitoba	Alberta	British Columbia	Canada
Building—								
Rough.....tons	492	342	10,584	10,902	1,138		3,210	26,668
\$	5,719	1,809	51,852	74,117	8,843		32,835	175,175
Dressed.....tons	153	52	15,301	5,815	40	43	1,026	22,430
\$	6,422	1,850	447,190	70,312	1,800	2,254	41,367	571,195
Monumental and ornamental—								
Rough.....tons	160	104	3,780	220	246		1,330	5,840
\$	3,200	1,482	27,406	4,385	6,205		14,272	56,950
Dressed.....tons	382	497	1,288	16	20		258	2,461
\$	28,700	72,393	81,753	546	583		37,400	221,375
Flagstone.....tons		30	62	3,021	31			3,144
\$		600	86	7,208	1,040			8,934
Curbstone.....tons		5	835				6	846
\$		77	3,308				200	3,585
Paving blocks.....tons		9	536	10			2	557
\$		100	4,652	110			40	4,902
Lining open-hearth furnaces.....tons					764			764
\$					1,688			1,688
Chemical—								
Flux in iron and steel furnaces.....tons			6,831	191,383	2,718			200,932
\$			9,522	136,113	4,511			150,146
Flux in non-ferrous smelters.....tons				122,731			22,079	144,810
\$				98,612			18,022	116,634
Glass factories.....tons			4,000			510		4,510
\$			14,000			765		14,765
Pulp and paper mills.....tons	3,366	6,552	111,977	38,568	5,985		34,445	200,893
\$	5,328	10,862	110,088	32,537	7,703		52,943	219,461
Sugar refineries.....tons		40	4,531	13,194		11,137		28,902
\$		190	4,078	8,576		17,820		30,664
Other chemical uses.....tons	68		24	113,808				113,900
\$	442		159	94,026				94,627
Pulverized stone—								
Crushed for artificial stone.....tons			1,496	575				2,071
\$			6,919	2,216				9,135
Whiting.....tons			5,414					5,414
\$			4,438					4,438
Asphalt filler.....tons	300		4,853	5,191				10,344
\$	1,806		13,726	10,943				26,475
Dusting coal mines.....tons						829		829
\$						3,320		3,320
Agricultural purposes.....tons	16,914	4,368	76,459	14,285		282	320	112,628
\$	23,838	15,600	80,313	8,910		1,130	1,280	131,071
Other uses.....tons			454	15,452				15,906
\$			1,158	51,362				52,520
Roofing granules.....tons				10,889			191	11,080
\$				87,066			2,865	89,931
Poultry grit.....tons			200	974	412	424	92	2,102
\$			1,200	4,637	1,584	1,900	632	9,953
Stucco dash.....tons			838	1,193	108		107	2,246
\$			4,519	4,720	396		1,023	10,658
Terrazzo chips.....tons			584	1,804				2,388
\$			3,748	7,251				10,999
Rock wool.....tons				5,322				5,322
\$				5,439				5,439
Rubble and riprap.....tons	192	45,469	209,972	201,916	1,070		240,967	699,586
\$	236	34,078	130,939	233,110	779		209,311	608,453
Crushed stone—								
Concrete aggregate.....tons			871,055	605,110	20,790		700	1,497,655
\$			705,733	487,709	20,039		700	1,214,181
Road metal.....tons	156,694		621,185	2,242,788	1,562		146,907	3,169,136
\$	203,407		503,076	1,690,544	1,622		123,431	2,522,080
Railroad ballast.....tons			6,137	617,833	6,307		11,971	642,248
\$			3,158	543,319	8,435		15,694	570,606
Total.....tons	178,721	57,465	1,958,396	4,223,000	41,191	13,225	463,611	6,935,612
\$	279,098	139,041	2,213,021	3,663,768	65,228	27,189	552,015	6,939,360
Per cent of total.....Quantity	2.58	0.83	28.24	60.89	0.59	0.19	6.68	100.00
Value	4.02	2.00	31.89	52.80	0.94	0.39	7.96	100.00

NOTE.—See footnote to table 417.

* Sales or shipments from quarries.

(a) Includes the production of slate.

Table 417.—*Production of Stone in Canada, by Kinds, Showing Purposes for Which Used, 1937

For use as follows:	Granite (a)	Limestone (b)	Marble	Sandstone	Slate	Total
Building stone—Rough..... tons	6,925	15,317	129	4,297		26,668
..... \$	51,110	98,634	5,939	19,492		175,175
—Dressed..... tons	6,257	14,624	275	1,274		22,430
..... \$	252,346	248,659	18,297	51,893		571,195
Monumental and Ornamental stone—						
—Rough..... tons	5,587	128	125			5,840
..... \$	48,520	4,992	3,438			56,950
—Dressed..... tons	2,375	65		21		2,461
..... \$	218,140	2,335		900		221,375
Flagstone..... tons	8	238		2,898		3,144
..... \$	75	1,507		7,352		8,934
Curbstone..... tons	796	50				846
..... \$	3,085	500				3,585
Paving blocks..... tons	547			10		557
..... \$	4,792			110		4,902
Lining open-hearth furnaces..... tons		764				764
..... \$		1,688				1,688
Chemical—						
Flux in iron and steel furnaces..... tons		200,932				200,932
..... \$		150,146				150,146
Flux in non-ferrous smelters..... tons		144,810				144,810
..... \$		116,634				116,634
Glass factories..... tons		510	4,000			4,510
..... \$		765	14,000			14,765
Pulp and paper mills..... tons		199,433	1,460			200,893
..... \$		218,292	1,169			219,461
Sugar refineries..... tons		28,902				28,902
..... \$		30,664				30,664
Other chemical uses..... tons		113,900				113,900
..... \$		94,627				94,627
Pulverized stone—						
Whiting..... tons		639	4,775			5,414
..... \$		1,281	3,157			4,438
Asphalt filler..... tons		10,344				10,344
..... \$		26,475				26,475
Dusting coal mines..... tons		829				829
..... \$		3,320				3,320
Agricultural purposes..... tons		111,428	1,200			112,628
..... \$		128,671	2,400			131,071
Other uses..... tons		15,811			95	15,906
..... \$		51,838			682	52,520
Crushed stone for manufacture of artificial stone..... tons		60	2,011			2,071
..... \$		300	8,835			9,135
Roofing granules..... tons	10,710				370	11,080
..... \$	85,715				4,216	89,931
Poultry grit..... tons	20	908	1,153		21	2,102
..... \$	200	3,916	5,687		150	9,933
Stucco dash..... tons		215	2,031			2,246
..... \$		1,419	9,239			10,658
Terrazo chips..... tons			2,388			2,388
..... \$			10,999			10,999
Rock wool..... tons		5,322				5,322
..... \$		5,439				5,439
Rubble and riprap..... tons	458,331	179,287		61,554	414	699,586
..... \$	431,758	125,703		50,521	471	608,453
Crushed stone—						
Concrete aggregate..... tons	103,726	1,387,524	232	6,173		1,497,655
..... \$	153,656	1,052,727	182	7,616		1,214,181
Road metal..... tons	138,995	2,877,534	1,863	150,744		3,169,136
..... \$	182,288	2,136,746	5,253	197,793		2,522,080
Railroad ballast..... tons	400,822	233,232		8,194		642,248
..... \$	395,748	166,664		8,194		570,606
Total Canada (b)..... tons	1,135,099	5,542,806	21,642	235,165	900	6,935,612
..... \$	1,827,433	4,673,942	88,595	343,871	5,519	6,939,360

(a) Includes all igneous rock.

(b) Does not include limestone used in Canadian lime and cement industries, but includes marl used for agricultural purposes.

Table 418.—Production of Granite* in Canada, 1928-1937

Year	Tons	Value	Year	Tons	Value
		\$			\$
1928.....	1,195,810	2,366,946	1933.....	256,723	679,585
1929.....	1,728,165	3,080,815	1934.....	200,285	781,739
1930.....	1,851,132	3,379,951	1935.....	326,354	1,126,287
1931.....	1,190,887	2,763,050	1936.....	941,743	1,319,313
1932.....	490,822	1,110,582	1937.....	1,135,099	1,827,433

*Includes all igneous rock.

According to the Bureau of Mines, Ottawa, the tendency in the building trade has been to employ coloured granites to a greater extent than heretofore in the form of thin polished slabs for trim for buildings in which the main colour scheme needs some contrast to relieve it.

Canadian granites are suitable for all the purposes for which granite is used, and with consistent advertising to enable the Canadian products to become better and more widely known, there is no reason why this industry should not have a promising future.

Table 419.—Production of Limestone and Sandstone in Canada, 1928-1937

Year	Limestone		Sandstone		Year	Limestone		Sandstone	
	Tons	Value	Tons	Value		Tons	Value	Tons	Value
		\$		\$			\$		\$
1928.....	6,949,420	7,267,437	100,951	223,236	1933.....	2,572,911	2,142,516	99,043	108,562
1929.....	7,720,840	8,172,681	159,407	398,974	1934.....	3,747,779	3,157,832	115,169	143,283
1930.....	7,732,675	8,075,616	384,610	769,060	1935.....	3,631,665	3,253,573	342,824	838,005
1931.....	6,262,430	6,305,538	924,101	1,332,883	1936.....	3,731,548	3,143,872	285,508	495,856
1932.....	3,687,241	3,227,715	500,480	349,458	1937.....	5,542,806	4,673,942	235,165	343,871

"The Canadian rock wool industry, which utilizes shaly dolomite in the manufacture of its various products, expanded considerably in 1937 and further expansion is in prospect. New uses for limestone are continually being developed. Recently a method has been found of combining dolomite (and also calcium limestone) with silica in the presence of a stabilizing agent to give a refractory product that contains no active lime or silica and will not disintegrate, and is comparable in refractoriness with materials that are several times as expensive. A present use for limestone that is capable of enormous development is in agriculture.

"The principal quarries from which limestone in blocks of large dimensions for building purposes is obtained are in Quebec, Ontario and Manitoba. In Quebec there are three quarries at St. Marc des Carrières producing grey limestone, and at Montreal several quarries producing a limestone of similar colour. In Ontario a large quarry near Queenston in the Niagara Peninsula, produces silver-grey limestone together with small quantities of buff and of variegated buff-and-grey, and at Longford Mills buff, silver-grey, and brown limestone for use both as marble and building stone is produced. The Manitoba quarries, three in number, are at Garson, near Tyndall, and yield mottled grey, mottled buff and mottled variegated limestone. In addition limestone quarries, producing small quantities of building stone (chiefly rubble) for local use, are worked near Quebec City and Hull in the Province of Quebec, and at Ottawa, Kingston, Erin and Wiarton in Ontario. Some of the quarry companies market stone in all stages of manufacture from the mill block to elaborately carved material. Other companies sell stone only in the mill block. Waste material is utilized for crushed stone, rubble, chemical and metallurgical purposes, etc." (Bureau of Mines—Ottawa).

"A new method of cleaning stonework, which has met with unqualified success in England, is worthy of consideration. It has been found that limestone surfaces can be cleaned effectively and with no damage to the stone by applying a fine misty spray of water to the surface for one to two hours before brushing. Experiments conducted on buildings of Bath and Portland stone ranging in age from 70 to 100 years gave very satisfactory results even where the stone was encrusted with greasy soot. A series of nozzles are attached to scaffolding and the stonework is sprayed in successive sections. After several hours soaking, the dust may be removed by light brushing. The method is particularly useful on carved work that cannot be brushed or rubbed easily. No caustic soda or other harmful chemicals are used. Canadian sandstone has been utilized extensively in the construction of many important public buildings in Canada and is finding increasing favour as a material in the construction of the better type home. The rock occurs in Canada in a variety of colours including white, reddish brown, purple (bands), yellow and grey. Shipments of sandstone were made in 1937 from quarries located in all of the provinces with the exception of Prince Edward Island, Manitoba and Saskatchewan.

Table 420.—Production of Marble in Canada, 1928-1937

Year	Tons	Value	Year	Tons	Value
		\$			\$
1928.....	7,753	414,682	1933.....	10,897	65,913
1929.....	14,012	414,062	1934.....	13,783	69,475
1930.....	26,089	809,582	1935.....	15,975	85,369
1931.....	20,442	668,713	1936.....	22,866	169,698
1932.....	12,379	250,706	1937.....	21,642	88,595

"Marble quarries are operated in the provinces of Quebec, Ontario, Manitoba and British Columbia for the production of squared blocks for sawing into slabs and for making monuments, and also for the production of broken marble for making terrazzo, stucco dash, whiting substitute, marble flour, artificial stone, and building rubble. A part of the production of some quarries is also marketed for chemical use . . . Progress is being made in finding new ways of utilizing marble. Thin slabs of semi-translucent, light coloured marble have been used in large windows of buildings and white marble sand is being produced for use in white cement. Many deposits of beautifully coloured marbles, particularly in Ontario, Quebec and British Columbia, have never been fully investigated, the chief reason being that the present demand in Canada for marble of any one colour, other than for a staple variety such as white, is comparatively small. In Quebec, four varieties of clouded grey marble, some of which are tinted and lined with green, and also black marble, are quarried at Phillipsburg. A small quantity of dry red marble is quarried, chiefly for use as tombstones, at Cap St. Martin near Montreal.

"In Ontario black marble is quarried at St. Albert, near Ottawa; buff and silver grey marbles are produced at Longford, near Orillia; and at Bancroft, Hastings County, a number of handsomely coloured marbles are available, the most striking of which, known as Bancroft Laurentian, is a clouded-grey breccia with a rich chocolate-coloured bond; white marble is quarried at Marmora and Haliburton, and buff, red, white, green and black marbles near Eldorado.

"In Manitoba, a number of highly coloured marbles are available and near Calgary in Alberta deposits of calcareous tufa are quarried for terrazzo chips. In British Columbia a bluish grey marble for making monuments is obtained at La Blanche station on the Lardeau branch of the Canadian Pacific Railway, while small quantities of white marble are quarried near Victoria and on Texada Island for the production of terrazzo, poultry grit and marble sand." (Bureau of Mines—Ottawa)

Table 421.—Production of Slate in Canada, 1924-1937

Year	Tons	Value	Year	Tons	Value
		\$			\$
1924-1929.....			1934.....	738	4,802
1930.....	150	3,000	1935.....	1,129	4,329
1931.....	250	5,000	1936.....	*1,247	5,414
1932.....	250	3,750	1937.....	900	5,519
1933.....	250	3,750			

* 444 short tons for roofing purposes and 803 short tons as rubble and riprap.

In 1937 slate was produced only in Quebec, Ontario and British Columbia; the output totalled 900 short tons valued at \$5,519 and was sold chiefly as roofing granules, terrazzo chips and rubble and riprap. The following information relating to the important slate industry in the United Kingdom is from "Mineral Trade Notes" issued by the U. S. Bureau of Mines:—

"While slate is produced in widely separated parts of the United Kingdom, the chief deposits are in North Wales, which furnish about 90 per cent of the total production. The slate industry in this region is of great antiquity. The deposits were discovered by the Romans, who, during their 400 years occupation of Britain, found many uses for the material. In the succeeding Saxon and Norman periods, however, little or no attention was given to slate quarrying until Henry III gave it a new impulse. From then, the industry developed steadily, the greatest development occurring in the nineteenth century. At present limited quantities of waste slate are marketed as powders crushed to varying degrees of fineness. At the Penrhyn quarry a slate powder is marketed for road surfacing with bitumen; the slate powder is also used as a mastic for flat roofs and as a filler in rubber, paint, paper and many other products. The most popular sizes of roofing slates are 24 x 12 inches, 20 x 10 inches, and 18 x 10 inches. As for trends, in the past few years, the North Wales slate industry has been unusually prosperous, however, the principal problem facing the slate industry, and one that has militated against a more substantial demand for slates, is the increasing use of tiles and other artificial roofing materials. Slate producers have attempted to meet part of the demand for coloured roofing in colouring slates various shades of green and red by a colloidal process. At present the all-in cost of roofing is about 30 per cent cheaper with tiles than with the best North Wales slate. In addition to the rapid strides that the tile industry has made at the expense of roofing slates, the demand has declined substantially for thick sheets and sawn slabs of slate, used in the past for dairy and sanitary fittings. For these purposes slate has been replaced by manufactured wares of a more aesthetic and hygienic nature, which also can be produced at lower cost."

Table 422.—Production of Stone for Building Purposes, Chemical Use, Cement Manufacture, Concrete Aggregate, Road Metal and Railway Ballast, 1930-1937

		Building stone (a)	For chemical purposes (b)	For concrete aggregate	For road metal	For railroad ballast	For cement manufacture
1930.....	tons	173,204	586,456	2,115,104	3,910,245	2,036,981	2,925,399
	\$	4,184,778	540,534	1,623,904	3,434,935	1,674,298	.....
1931.....	tons	129,345	333,699	3,275,276	3,122,633	652,352	2,489,147
	\$	3,717,993	314,088	2,565,204	2,557,515	485,447	.....
1932.....	tons	62,951	226,966	1,929,756	1,847,371	89,835	1,141,376
	\$	1,035,571	188,820	1,320,088	1,474,870	84,930	.....
1933.....	tons	40,299	315,287	981,460	1,212,981	93,624	616,364
	\$	340,852	297,652	682,213	969,504	52,359	.....
1934.....	tons	52,665	489,580	821,099	2,062,487	345,802	806,546
	\$	490,095	447,429	608,240	1,668,927	209,296	.....
1935.....	tons	200,899	537,799	804,179	1,976,363	351,302	818,443
	\$	1,258,741	483,709	523,847	1,987,351	211,993	.....
1936.....	tons	42,335	615,207	1,014,145	1,903,927	784,081	1,180,358
	\$	714,616	553,597	730,617	1,653,134	659,656	.....
1937.....	tons	49,098	693,947	1,497,655	3,169,136	642,248	(c) 1,465,168
	\$	746,370	626,297	1,214,181	2,522,080	570,606	.....

(a) Does not include monumental or ornamental stone.

(b) Does not include limestone used in Canadian Lime industry.

(c) Includes shale.

Table 423.—Consumption of Whiting, and Chalk, by Uses, as Reported to the Annual Census of Industry, 1936-1937

Industry	1936		1937	
	Tons	Cost at works	Tons	Cost at works
Paints and pigments.....	6,082	\$ 105,678	6,183	\$ 108,290
Rubber.....	6,352	92,192	7,299	107,781
Miscellaneous textiles*		18,605		13,088
Explosives (a).....	185	1,291	211	1,454
Miscellaneous non-metallic manufactures.....	5	240	4	55
Toilet preparations (a).....	69	6,329	110†	8,489

* Includes oilcloth and linoleum.

(a) Chalk. † Ground and precipitated.

Table 424.—Calculated Effect of Insulation on Fuel Consumption of Uninsulated House

Area insulated	Type of insulation	Normal fuel consumption saved %
Windows.....	Storm windows.....	10
Walls.....	Rigid or flexible insulation 1 inch.....	10
Walls.....	Fill, 3½ inches mineral wool type.....	18
Roof.....	Rigid or flexible insulation 1 inch.....	14
Roof.....	Fill, 3½ inches mineral wool type.....	10
Windows, roof and walls.....	Storm windows, rigid or flexible insulation 1 inch.....	30
	Storm windows, fill insulation 3½ inches mineral wool type.....	42

NOTE: For data relating to the thermal conductivity of rock wool and other sundry insulation see annual Mineral Production report for 1935.

The data in the above table are taken from "Engineering and Contract Record"—Toronto, and were compiled by the Ontario Research Foundation. They represent the probable savings in fuel consumption for a "typical" well-constructed, two storey house. The values represent ideal conditions.

Table 425.—Employees, Salaries and Wages, Specified Costs and Net Values, in the Stone Industry in Canada, by Provinces, 1937

Province	Firms	Average number of employees			Salaries and wages		Cost of fuel, electricity and process supplies used	Net value of production
		Salaried employees	Wage-earners		Salaries	Wages		
	No.	M.	F.		\$	\$	\$	\$
Nova Scotia.....	26	11	.....	116	11,800	89,023	35,191	243,907
New Brunswick.....	9	7	.....	86	8,750	52,141	9,491	129,550
Quebec.....	184	115	13	1,310	148,228	873,946	373,123	1,839,898
Ontario.....	163	84	16	932	188,613	950,453	612,870	3,050,898
Manitoba.....	6	12	1	27	36,404	17,649	11,407	53,821
Alberta.....	3	.....	.....	1	.....	1,265	102	27,087
British Columbia.....	27	24	1	142	33,829	164,243	43,364	508,651
Canada.....	418	253	31	2,614	427,624	2,148,720	1,085,548	5,853,812

Table 426.—Capital Employed in the Stone Quarrying Industry of Canada, by Provinces, 1937

Province	Plants	Capital employed as represented by:						Total
		Present cash value of the land*	Present value of buildings, fixtures, machinery, tools and other equipment	Inventory value of materials on hand, stone in process, fuel and miscellaneous supplies on hand	Inventory value of finished products on hand	Operating capital (cash, bills and accounts receivable, prepaid expenses, etc.)		
	No.	\$	\$	\$	\$	\$	\$	
Nova Scotia.....	44	72,141	90,230	5,782	17,630	9,398	195,181	
New Brunswick.....	13	81,738	43,236	11,455	7,965	48,367	192,761	
Quebec.....	198	1,278,010	2,637,062	315,459	409,178	687,291	5,327,000	
Ontario.....	176	551,533	4,361,802	168,044	237,511	595,723	5,914,613	
Manitoba.....	9	229,680	288,541	31,670	.....	92,472	642,363
Alberta.....	3	(a)	1,500	(a)	(a)	5,000	6,500	
British Columbia.....	112	48,372	403,475	14,142	15,135	97,995	579,119	
Canada.....	555	2,261,474	7,825,846	546,552	687,419	1,536,246	12,857,537	

* Excluding unmined material.

(a) Not recorded.

Table 427.—Average Number of Wage-Earners, in Primary Stone Industry, By Months, 1935, 1936 and 1937

Month	1935	1936	1937	Month	1935	1936	1937
January.....	779	1,119	1,098	July.....	3,076	3,305	3,785
February.....	839	1,024	1,091	August.....	3,138	3,232	3,804
March.....	1,069	1,245	1,441	September.....	3,287	2,699	3,782
April.....	1,580	1,891	2,089	October.....	3,175	2,610	3,413
May.....	2,440	2,871	2,922	November.....	2,584	2,204	2,637
June.....	2,890	3,407	3,284	December.....	1,643	1,266	1,875

Table 428.—Imports into Canada and Exports of Stone, by Kinds, 1936-1937

	1936		1937	
	Quantity	Value	Quantity	Value
		\$		\$
IMPORTS—				
Curling stones and handles..... pair	618	13,354	669	14,710
Building stone, other than marble or granite, sawn on more than two sides, but not sawn on more than four sides.....				
Building stone, other than marble or granite, planed, turned, cut or further manufactured than sawn on four sides..... ton	87	9,222	8	314
Flagstone, sandstone, and all building stone, not hammered, sawn or chiselled..... ton	3,049	20,446	5,818	34,479
Flagstone and building stone, other than marble or granite, sawn on not more than two sides..... ton	460	3,456	1,202	8,479
Granite, rough, not hammered or chiselled.....		70,667		80,273
Granite, sawn only.....		7,094		11,022
Granite, monuments.....		17,628		16,732
Granite, manufactures of, n.o.p.....		4,733		6,908
Marble, rough, not hammered or chiselled.....		15,765		16,729
Marble, sawn or sand rubbed, not polished.....		24,107		31,991
Marble, not further manufactured than sawn for tombstones.....		11,715		12,655
Marble, manufactures of, n.o.p.....		15,774		15,327
Ornamental or decorative marble (not chips), unicolour or variegated, of colours or texture not produced in Canada; rough or dressed, etc., for church interiors (*).....				12,561
Paving blocks of stone.....		20		22
Refuse stone, not sawn, hammered or chiselled..... ton	304,440	184,481	592,593	348,319
Slate roofing..... square	1,426	12,294	2,162	18,711
Slate pencils and school writing slates.....		8,524		5,790
Slate mantels and manufactures of slate, n.o.p.....		13,337		30,270
Chalk, china, Cornwall or cliff stone and mica schist.....		32,253		55,558
Mineral wool..... ton	1,196	101,592	1,015	81,050
Whiting, gilders' whiting and Paris white..... ton	12,498	121,017	11,992	126,015
Manufactures of stone, n.o.p.....		17,055		25,170
Lithographic stones not engraved.....		186		266
Chalk, prepared.....		8,219		6,873
Pumice and pumice stone, lava and calcareous tufa, not further manufactured than ground.....		21,275		26,238
Grindstones, not mounted, and not less than 36 inches in diameter..... No.	1,013	122,028	1,587	157,699
Burrstones, rough in blocks..... No.	158	570	24	1,232
Ganister..... ton	4,097	8,140	2,405	5,980
Total.....		864,952		1,151,373
EXPORTS—				
Crushed stone..... ton	49,728	90,924	132,006	233,824
Granite and marble, unwrought..... ton	1,156	8,788	1,234	11,408
Freestone, limestone, and other building stone, unwrought..... ton	571	2,090	659	1,380
Dressed stone of all kinds.....		3,380		3,846
Grindstones, manufactured.....		1,688		135
Total.....		106,870		250,593

(*) From February 26, 1937.

(2) Secondary Production—The Monumental and Ornamental Stone Industry

In 1937 there were 229 stone dressing works not operating in conjunction with the producers' own quarries. These works were engaged chiefly in cutting and polishing Canadian or imported stone to produce finished monuments or dressed stone for construction purposes. Output from these establishments was valued at \$3,371,242 in 1937, a gain of 1.8 per cent over the \$3,309,911 in 1936. Ontario plants numbering 121 accounted for 57 per cent of the total production and the 46 works in Quebec made 20 per cent.

The average number of employees in this industry in 1937 was 1,159 compared with 1,245 in the previous year; payments in salaries and wages decreased to \$1,352,566 from \$1,357,808.

Purchased materials, excluding fuel and power, used in manufacturing cost \$1,142,885 in 1937 as against \$1,070,902 in 1936.

Output value of dressed monumental and ornamental stone advanced 1.6 per cent during 1937 to \$1,762,400 from \$1,734,278, and the value of dressed building stone declined 41 per cent to \$965,412 from \$1,654,034 in 1936.

Table 429.—Production from the Monumental and Ornamental Stone Industry, by Provinces, 1936 and 1937

	Granite		Marble		Marble chips and dust	Limestone		Finished monuments, lettered only	Other products	Total
	Monuments	For building purposes	Monuments	For building purposes		Monuments and bases	For building purposes			
	\$	\$	\$	\$	\$	\$	\$	\$	\$	\$
Prince Edward Island										
1936.....	7,900	30	12,800	23				6,280		27,033
1937.....	9,000	67	17,400					8,568		35,035
Nova Scotia—										
1936.....	63,801		11,631	200		2,953		19,038	1,058	98,681
1937.....	59,888	89	14,046	737		2,954	31,669		2,198	111,581
New Brunswick—										
1936.....	48,231	1,100		620		140		2,180	270	52,541
1937.....	70,367	1,000	1,340			1,430		1,030	250	75,417
Quebec—										
1936.....	321,039	117,068	19,715	48,759	1,047	3,190	40,621	19,691	27,258	598,388
1937.....	316,326	53,507	29,598	101,979	2,800	3,745	119,457	23,277	40,731	691,420
Ontario—										
1936.....	699,148	37,159	60,015	36,107	210	18,041	435,754	289,282	287,775	1,863,491
1937.....	800,638	25,913	65,075	187,649		100,577	266,483	264,542	213,483	1,924,360
Manitoba—										
1936.....	51,485	210	3,949	33,531	5,658	1,368	9,872	32,146	1,172	139,391
1937.....	48,563	1,554	6,674	19,200	350	1,150	3,711	31,217	3,155	115,574
Saskatchewan—										
1936.....	42,616	1,455	20,716	2,087	840	7,320	18,128	9,170	31,670	134,002
1937.....	41,773	1,933	23,883	958	229	4,850	5,430	14,113	7,469	100,638
Alberta—										
1936.....	40,110	4,000	14,072	4,000	5,031	2,150	10,000	9,401	1,870	90,634
1937.....	48,103	6,000	15,389	5,000	7,040	2,498	10,500	12,212	3,198	109,940
British Columbia—										
1936.....	42,675	169,284	7,731	50,507	21			23,452	12,080	305,750
1937.....	74,237	89,494	2,696	31,882		200	1,200	1,670	5,898	207,277
Canada—										
1936.....	1,317,005	330,306	150,629	175,834	12,807	35,162	514,375	410,640	363,153	3,309,911
1937.....	1,468,895	179,557	176,101	347,405	10,419	117,404	438,450	356,629	276,382	3,371,242

EXPLANATORY NOTES

Method of Computing Quantities and Values of the Mineral Production of Canada in 1937.

Arsenic.—White arsenic (As_2O_3) shipped from Canadian smelters at its sales value.

Bismuth.—(a) Recoverable metal in silver-lead-bismuth bullion shipped to foreign smelters for refining at an arbitrary price; (b) Bismuth metal produced at Canadian smelters valued at the average New York price for the year.

Cadmium.—Smelter production valued at the average London price for the year.

Cobalt.—Cobalt content of the various cobalt products sold by the Ontario smelter producing these products added to the cobalt content of ores and residues exported for treatment in foreign smelters; the value given is the net amount received by the shippers.

Copper.—(a) Recoverable copper in ores and concentrates exported valued at the average London price for the year, in Canadian funds; (b) Copper in blister copper made at Manitoba, Ontario and Quebec smelters valued at the average London price for the year in Canadian funds; (c) Copper in copper-nickel matte exported from Canadian smelters valued at an arbitrary price agreed upon between the Dominion Bureau of Statistics and the Ontario Department of Mines.

Gold.—Gold in bullion produced and the recoverable gold in all other Canadian mine products is valued at the standard rate of \$20.671834 per fine ounce until the end of 1930. For succeeding years, unless otherwise specified, gold is valued at the average price on world markets transposed to Canadian funds.

Lead.—Recoverable lead in ores exported from Canada added to lead contained in base bullion made at Trail, B.C., valued at the average London quotations for the year in Canadian funds.

Nickel.—(a) Refined and electrolytic nickel produced at Canadian refineries valued in Canadian funds at the average price obtained for such products sold during the year; (b) Nickel in oxides and salts sold from Canadian smelters and refineries at its total selling value in Canadian funds in the form in which it was sold; (c) Nickel in matte exported from Canada valued at an arbitrary figure agreed upon by the Ontario Department of Mines and the Dominion Bureau of Statistics (representative of the value of the nickel in matte form).

Platinum Group Metals.—Recoverable metals in smelter products and placer platinum at the average London price and transposed to Canadian funds.

Silver.—Silver bullion produced and the recoverable silver in other smelter products, and the recoverable silver in Canadian ores exported, at the average New York price in Canadian funds for the refined metal.

Tellurium and Selenium.—Smelter production valued at the average London price for the year.

Zinc.—Refined zinc produced by the Consolidated Mining and Smelting Co., Ltd., at Trail, B.C., and by the Hudson Bay Mining and Smelting Co., Ltd., Flin Flon, Manitoba, and the recoverable zinc in concentrates exported, valued at the average monthly price quoted in London, in Canadian funds.

Coal.—Output tonnage evaluated pro rata according to income from sales.

Other Non-Metallic Minerals, Clay Products and Structural Materials.—Shipments during the year at their respective sales values.

Imports.—Statements of quantities and values are based on the declarations of importers, as subsequently checked by government officials.

The value of imported merchandise is the fair market value or the price thereof when sold for home consumption in the principal markets of the country whence and at the time when the same were exported directly to Canada. The price and value of the goods in every case are stated as in condition packed ready for shipment, the fair value being shown in the currency of the country of export, and the selling price to the purchaser in Canada shown in the actual currency in which the goods were purchased. In the case of goods that are the manufacture or produce of a foreign country, the currency of which is substantially depreciated, the value stated is the value that would be placed on similar goods manufactured or purchased in the United Kingdom and imported from that country, if such similar goods are made or produced there. If similar goods are not made or produced in the United Kingdom, the value stated is the value of similar goods made or produced in any European country, the currency of which is not substantially depreciated.

Exports.—Statements of quantities and values are based on the declaration of exporters as subsequently checked by government officials.

The value of exports of Canadian merchandise is the actual cost or the value at the time of exportation at the points in Canada whence originally shipped.

Weight.—Weight, where shown in imports and exports is the net weight of the goods, excluding the weight of the covers or receptacles, except in the cases of certain goods, as provided in the tariff.

The expression "ton" means 2,000 pounds, and cwt. 100 pounds, avoirdupois. Where other units of quantity are used, imperial standards apply.

DIAMOND DRILLING INDUSTRY, 1938

According to a survey conducted by the Bureau, there were 43 firms engaged in contract diamond drilling of Canadian mineral deposits during 1938. The income received by this industry from drilling operations conducted during the year under review totalled \$3,956,564, the number of wage-earners was reported at 1,627, and the amount of wages paid amounted to \$1,801,988. The footage drilled in the entire Dominion aggregated 2,296,773 feet of which 57·3 per cent was completed in Ontario, 31·2 per cent in Quebec, and 5·1 per cent in British Columbia. Contract diamond drilling was also conducted in Nova Scotia, New Brunswick, Manitoba, Saskatchewan and the Northwest Territories. The industry, as a whole, purchased in 1938, borts, ballas, carbons (black diamonds), ready set bits, etc., valued at \$649,374. Not included in this survey are data relating to the drilling of gas and oil wells and diamond drilling conducted by Canadian mining companies with their own personnel and equipment. Statistics relating to these latter operations are combined with those pertaining to the Canadian mining industry proper.

Imports into Canada during 1938 of diamond dust or bort and black diamonds for borers were valued at \$3,950,698 compared with \$4,630,037 in 1937. Imports of diamond drills and core drills, not including motive power, and electrically operated rotary coal drills, and coal cutting machines, n.o.p., and integral parts of the foregoing, for use exclusively in mining operations, were appraised at \$151,519 in 1938 as against \$198,426 in 1937. Imports of unset diamonds into Canada in 1938 were valued at \$983,112 compared with \$1,304,201 in 1937.

Diamond Drilling Operations in Canada—1938

Province.	Footage drilled	Income from drilling	Number of employees	Total wages paid
Nova Scotia.....	5,598	\$ 4,000	15	\$ 8,794
New Brunswick.....	6,091	11,530	6	4,660
Quebec.....	717,162	1,328,908	465	571,697
Ontario.....	1,315,621	2,146,904	910	1,026,178
Manitoba.....	42,700	70,924	29	19,864
Saskatchewan.....	32,905	56,171	54	20,843
Alberta.....				
British Columbia.....	116,789	200,125	105	102,360
Yukon.....	59,907	138,002	43	47,592
Northwest Territories.....				
Canada.....	2,296,773	3,956,564	1,627	1,801,988

DIRECTORY OF FIRMS

In the following pages the names and addresses of all the principal operators in the Canadian mining industry are given and the location of the properties worked in 1937 is also shown.

METAL MINING INDUSTRIES

Alluvial Gold Mining Industry

Name	Head office address	Location
QUEBEC—		
Mines Landry Limitée.....	Mont Joli.....	Dorchester Co.
Embergold Mines Ltd.....	956 New Birks Bldg., Montreal.....	Compton Co.
Dion, Geo. A.....	19 rue St. Etienne, Lévis.....	Rivière des Plantes.
BRITISH COLUMBIA—		
Alert Placers, Ltd.....	Barkerville.....	Cariboo Mining Dist.
Amador Hydraulic Placer, Ltd.....	302 Toronto General Trusts Bldg., Calgary, Alberta.....	Cariboo M.D.
Anderson, Olivier.....	Fort Steele.....	Fort Steele.
Baker & Peeling.....	Keithley.....	Quesnel M.D.
Barrington, S.C.....	Wrangell, Alaska.....	Cassiar M.D.
B. C. Development, Ltd.....	Quesnel.....	Fraser River.
B. C. Gold Dredgers, Ltd.....	1150 Charles St., Vancouver.....	Ashcroft Division.
Big Six Partnership.....	Louis Creek.....	Revelstoke M.D.
Black Jack Gold Placers, Ltd.....	Barkerville.....	Cariboo M.D.
Boundary Gold Placers, Inc.....	Greenwood.....	Greenwood M.D.
Brewer, Alfred, & Johnson, Paul.....	Lumby.....	Vernon M.D.
Bride, Maurice.....	Spruce Creek, Atlin.....	Spruce Creek.
Boquist, Gus.....	Atlin.....	Atlin.
Bullion Placers, Ltd.....	917 Vancouver Bk., Vancouver.....	Quesnel M.D.
Campbell, Robert.....	Grand Forks.....	Grand Forks M.D.
Cedar Creek Hydraulic Mines Ltd.....	323 Gayward Bldg., Victoria.....	Quesnel M.D.
Colpe Mining Co., Ltd.....	Atlin.....	Atlin M.D.
Columbia Development Ltd.....	410 King St., Kitchener, Ont.....	Atlin M.D.
Compagnie Française Des Mines D'Or du Canada.....	19 rue D'Aumale (IXe), Paris, France.....	Atlin M.D.
Consolidated Gold Alluvials of B.C., Ltd.....	708 Vancouver Block, Vancouver.....	Cariboo M.D.
Consolidated Mining & Smelting Company of Canada, Limited.....	Trail.....	Lumberton.
Consolidated Mining & Smelting Company of Canada, Limited.....	Trail.....	Barkerville, Cariboo M.D.
Consolidated Mining & Smelting Company of Canada, Limited.....	Trail.....	Omenica M.D.
Consolidated Mining & Smelting Company of Canada, Limited.....	Trail.....	Atlin.
Cowan, W. B.....	943 Byng Place, Winnipeg, Man.....	Omenica M.D.
Cox, Thomas F.....	Marysville.....	Fort Steele.
Craft, S. R.....	Atlin.....	Consolation Creek.
Crowe-Kelly Company.....	Atlin.....	Spruce Creek.
Dragon Creek Hydraulic.....	Wells.....	Cariboo M.D.
Drayton, William A.....	Fort Steele.....	Fort Steele M.D.
Dunsmore Gold Mines, Ltd.....	433 Tegler Bldg., Edmonton, Alberta.....	Omineca M.D.
Eastman Red Gulch Placers, Ltd.....	P.O. Box 54, Wells.....	Cariboo M.D.
Enman, R. E.....	Lytton.....	
Ewen & Oscarson.....	New Lumberton.....	Moyie River.
Falconer, W. K.....	Spruce Creek, Atlin.....	Spruce Creek.
Feyer, J. H.....	Wingdam, P.O.....	Wormald Cr.
Fowler, Luke.....	Hazelton.....	Manson River.
French Creek Hydraulic Placers, Ltd.....	410 Lancaster Bldg., Calgary, Alberta.....	Cariboo M.D.
Gairns, C.; Olson, L. E.; Bachland, J.; Matson, T.; Giesen, Fred; Huffman, E. Robert.....	Atlin.....	Atlin.
Germansen Mines, Ltd.....	719-789 Pender St., Vancouver.....	Omineca M.D.
Gold Channels, Ltd.....	2-425 Howe St., Vancouver.....	Yale M.D.
Goodheart, Fred.....	Tranquille.....	Kamloops M.D.
Guyet Placers, Ltd.....	1408 Royal Bank Bldg., Vancouver.....	Barkerville.
Hall, G. Elez. G.....	R. R. No. 1, Kelowna.....	Vernon.
Hasbrouck, W. C., & Bower, J. F.....	Keithley Creek, Cariboo.....	Quesnel M.D.
Hill, Charles.....	Atlin.....	Pine Creek, Atlin.
Horselty Hydraulic Group.....	Horse Fly.....	Quesnel M.D.
Hultgren, Alof.....	Atlin.....	Spruce Creek.
Husselbee & Smith.....	Atlin.....	Atlin.
Ivanic & Co.....	Spruce Creek, Atlin.....	Atlin.
Jawbone Creek Mine.....	Van Winkle.....	Cariboo.
Jobin, George E.....	Chapman Camp.....	Fort Steele M.D.
Johnson, Charles W.....	Celista, P.O.....	Kamloops M.D.
Johnson, Konrad.....	Atlin.....	Atlin.
Johnson & Co.....	Atlin.....	Spruce Creek.
Jolly Creek Placers.....	Roak Creek.....	Jolly Creek, Greenwood M.D.

DIRECTORY OF FIRMS—Continued
Alluvial Gold Mining Industry—Concluded

Name	Head office address	Location
BRITISH COLUMBIA—Concluded		
Kennedy, W., Watt, Geo.	Atlin	Pine Creek.
Ketch Ltd., and MacDougall.	Box 28, Barkerville.	Cariboo M.D.
King Mining & Prospective Trust.	Box 94, Nelson.	Ymir Mining Camp.
Last Chance Creek Placer.	Barkerville.	Last Chance Creek.
Logan, John; Kinderchuk, Nicholas.	Atlin.	Atlin Lake.
Lost Creek Placer Gold.	545 Mahon Ave., North Vancouver.	Omineca.
Lowhee Mining Co., Ltd.	917 Rust Bldg., Tacoma, Wash., U.S.A.	Cariboo M.D.
Mahaffy, Wm. A.	Brennan Flat, Hudson Hope.	Peace River.
Marshall, Henry G.	Blue Canyon, Atlin.	Atlin.
Matson & Shultz.	Atlin.	Ruby Creek.
McCrae, Alex., & Sons.	32 Douglas St., Revelstoke.	Revelstoke M.D.
McKinnon, Chas. E.	Atlin.	Key Creek, Atlin.
Mencenbach, W. F.	Kimberley.	Fort Steele M.D.
Moses, Wm.	Coalmont.	Granite Creek.
Moose Syndicate.	Likely, P.O.	
Morrison, A. M.	Atlin.	Atlin.
Murphy, Nathan.	Atlin.	O'Donnell River.
Nelson Placers, Ltd.	347 Baker St., Nelson.	49 Creek Nelson M.D.
Northern Ventures, Ltd.	Box 1585, Prince Rupert.	Vital Creek, Omineca M.D.
Ohman & Johansam Co.	Atlin.	Spruce Creek.
Pirnie, J. M.	Atlin.	Atlin Dist.
Placer Engineers, Ltd.	Room 508, Randall Bldg., Vancouver.	Keithley and Four Mile Creeks, Quesnel M.D.
Powell, Julius.	Wells.	Coulter Creek, Cariboo M.D.
Price, C. P.	Beaver.	Golden M.D.
Papich, Tom.	Atlin.	O'Donnell River, Atlin M.D.
Roach, Eli.	Skookumchuck.	
Rosette, S., and Hayward, A. E.	Mansion Creek, via Fort St. James.	Omineca M.D.
Saderlund, H. J., and Gilderdale, F.	Tranquille.	Tranquille Creek.
Sang Dang Placer.	Barkerville.	Slough Creek, Cariboo M.D.
Scotch Creek Placer Mines, Ltd.	501 Bank of Commerce Bldg., 389 Main St., Winnipeg, Man.	Kamloops M.D.
Slade-Cariboo Gold Placers, Ltd. & Slade Placers, Ltd.	621 Kinnear Place, Seattle, Wash., U.S.A.	Cariboo M.D.
Smith, Lora M.	1695 Pine Crescent, Vancouver.	
Standfast, John T.; Ewbank, Austin J.	Revelstoke.	West Kootenay.
Sundberg, Magnus.	Wingdam.	Donovan Creek.
Tarsia, Lewis.	Dorreen.	Lorne Creek, Omineca.
Tate, Frank Fleming.	1133 Pearl St., Alameda, Cal., U.S.A.	Omineca M.D.
Thompson, John.	Atlin.	Burnside O'Donnell River.
Tom Creek Placers Ltd.	504 Randall Bldg., Vancouver.	Omineca.
Tong Sing Tong.	Barkerville.	Slough Creek, Cariboo M.D.
Trehouse Hydraulic Gold Mining Co.	Barkerville.	Cunningham Creek.
Triple Hydraulic Placers, Ltd.	Box 28, Barkerville.	Cariboo M.D.
Turnquist, Emil.	Atlin.	Ruby Creek, Atlin.
Unk River Placer Gold Co. Inc.	Box 1138, Ketchikan, Alaska.	Sulphurets Creek.
Watson, John R.	Dorreen.	Omineca M.D.
Williams, C. M.	Revelstoke.	McCullouch Creek.
Wing, David L.	Box 113, Wrangell, Alaska.	Quartz Creek.
Wooden, E. H.	Atlin.	Atlin M.D.
Wright, Lydia H.	Atlin.	Spruce Creek, Atlin.
YUKON—		
Inca Mining Corp., Ltd.	3006 Union Guard Bldg., Detroit, Mich., U.S.A.	Iron Creek.
Holbrook Dredging Co.	Dawson.	Sixty-Mile River.
McCormick & Stewart.	Glacier Creek, P.O.	Glacier Creek.
Yukon Consolidated Gold Corp., Ltd.	Ottawa, Ontario.	Dawson M.D.

NOTE.—In addition to the operators listed, there were numerous others from whom official returns were not received.

Principal Operators (x) in Canadian Auriferous Quartz Mining Industry

(*) Active but not producing

NOVA SCOTIA—		
Aulenback, James R.	Box 127, Bridgewater.	Lunenburg Co.
Avon Gold Mines, Ltd.	407 Insurance Exchange Bldg., 276 St. James St., Montreal, P.Q.	Halifax Co.
Beaver Dam Gold Mines, Ltd.	1010 St. Catherine St. W., Montreal, P.Q.	Halifax Co.
*Belgo-Canadienne de Prospection Minière, Ltd	417 rue St. Pierre, Montreal, P.Q.	Mooseland.
Berggren, Chester.	R.R. 2, Bedford.	Hants Co. (West Gore).
*Cameron & White.	Carleton.	Yarmouth Co.
Consolidated Mining & Smelting Company of Canada, Ltd.	215 St. James St. W., Montreal, P.Q.	Cariboo Mines, Halifax Co.
*Consolidated Mining & Smelting Company of Canada, Ltd.	215 St. James St. W., Montreal, P.Q.	Dufferin Mine, Halifax Co.
Deal, Andrew.	Fairview.	Hants Co.
Douglas, L. H.	Caledonia.	Queens Co.
Guysborough Mines Ltd.	Goldenville.	Guysborough Co.

DIRECTORY OF FIRMS—Continued

Name	Head office address	Location
Principal Operators (x) in Canadian Auriferous Quartz Mining Industry, 1937—Continued		
NOVA SCOTIA—Concluded		
Government, Nova Scotia (Lacey Mine).....	N.S. Department of Public Works and Mines, Halifax.....	Halifax, Co.
*McDonald-Hudson.....	Cross Road County Harbour.....	Guysboro Co.
Montague Gold Mines, Ltd.....	Prudential Trust Co., Toronto, Ont.....	Halifax, Co.
Nugold Mining Corp., Ltd.....	1406 Concourse Bldg., 100 Adelaide St. W., Toronto, Ont.....	Lunenburg Co.
Otter Lake Gold Mines, Ltd.....	Crown Office Bldg., 26 Queen St., Toronto, Ont.....	Guysboro Co.
Prasac, Ltd.....	401 Roy Building, Halifax.....	Halifax Co.
Queens Mines, Ltd.....	297 Agricola St., Halifax.....	Hants Co.
Scotia Metals, Ltd.....	Truro.....	Guysborough Co.
Seal Harbor Gold Mines, Ltd.....	57 Bloor St. W., Toronto, Ont.....	Guysborough Co.
QUEBEC—		
*Abbeville Gold Mines, Ltd.....	388 St. James St. W., Montreal.....	Rouyn Tp.
*Admiral Cadillac Gold Mines, Ltd.....	381 Eglinton Ave. W., Toronto, Ont.....	Cadillac Tp.
*Agaurs Explorations, Ltd.....	105 St. James St. W., Montreal.....	N. W. Quebec.
*Allen Cassels Syndicate.....	Box 2400, Montreal.....	Bousquet Tp.
*Amm Gold Mines, Ltd.....	Kewagama.....	Kewagama.
*Amos-Cadillac (Quebec), Ltd.....	Kewagama.....	Bousquet Tp.
*Amos Duvernay Gold Mines, Ltd.....	2 Elmwood Ave., Montreal.....	Duvernay Tp.
*Arncoeur Gold Mines, Ltd.....	Arntfield.....	Dasserat Tp.
*Arntfield Gold Mines, Ltd.....	Arntfield.....	Beauchastel Tp.
*Arno Mines, Ltd.....	63 Sparks St., Ottawa, Ont.....	Rouyn and Joannes Tps.
*Arrowhead Gold Mines, Ltd.....	240 St. James St. W., Montreal, P.Q.....	Joannes Tp.
*Ascot Gold Mines Ltd.....	Amos.....	Malartic Tp.
*Astoria Rouyn Mines, Ltd.....	187 Main St., Hull, also P.O. Box 418, Rouyn.....	Rouyn Tp.
*Athlone Gold Mines, Ltd.....	388 St. James St. W., Montreal.....	Senneville, Bourlamaque and Bousquet Tps.
*Auric Mines, Ltd.....	Room 709, Lewis Bldg., 465 St. John St., Montreal.....	Bourlamaque Tp.
*Avocalon Mining Syndicate, Ltd.....	67 Yonge St., Toronto, Ont.....	Vauquelin Tp.
*Barraute Mining Co., Ltd.....	369 Mt. Royal West, Montreal.....	Abitibi Co.
*Barry Lake Gold Mines, Ltd.....	Suite 207-9, 71 St. Peter St., Quebec.....	Barry Tp.
*Bayside Malartic Mines, Ltd.....	206 Coronation Bldg., 1405 Bishop St., Montreal.....	Malartic Tp.
Beattie Gold Mines (Quebec), Ltd.....	25 King St. W., Toronto 2, Ont.....	Duparquet Tp.
*Beauchastel Mines, Ltd.....	360 St. James St. W., Montreal.....	Beauchastel Tp.
*Beaucourt Gold Mines, Ltd.....	1604 Edifice Aldred, 507 Place d'Armes, Montreal.....	Louvencourt.
*Beaufort Mining Corporation.....	Perron.....	Pascal, Louvencourt Tps.
Belleterre Mines, Ltd.....	15 King St. W., Toronto, Ont.....	Guilet Tp.
*Bidquebec Mines, Ltd.....	Rouyn.....	Bourlamaque Tp.
*Blake Chibougamau Mining Corp.....	71 rue St. Pierre, Quebec.....	Obalski & McKenzie Tps.
*Blouin Lake Gold Mines, Ltd.....	Room 516, Canada Cement Bldg., Montreal.....	Bourlamaque Tp.
*Bourbeau Lake Chibougamau Mines, Ltd.....	New Liskeard.....	McKenzie Tp.
*Bourlamaque Gold Mines, Ltd.....	726 Insurance Exchange Bldg., Montreal.....	Bourlamaque Tp.
*Bouscadillac Gold Mines, Ltd.....	1116 Federal Bldg., 85 Richmond St. W., Toronto, Ont.....	Bousquet Tp.
*Brooke Cadillac Gold Mines, Ltd.....	400 St. James St. W., Montreal.....	Cadillac Dist.
*Brown Bousquet Mines, Ltd.....	803-437 St. James St., Montreal.....	Bousquet Tp.
*Brown Cadillac Gold Mines, Ltd.....	486 St. John St., Montreal.....	Bousquet Tp.
*Brownlee Mines (1936), Ltd.....	200 Bay St., Toronto, Ont.....	Rouyn Tp.
*Bruell Gold Mines (1936), Ltd.....	402 Victoria Bldg., Toronto, Ont.....	Vauquelin Tp.
*Burwell Gold Mines, Ltd.....	231 St. James St., Montreal.....	Varsan Tp.
*Cache d'Or Gold Mines (Quebec), Ltd.....	372 Bay St., Toronto, Ont.....	Bourlamaque Tp.
*Cache Lake Chibougamau Mines, Ltd.....	Room 325-132 St. James St. W., Montreal.....	Chibougamau Dist.
*Cadillac Goldfields, Ltd.....	726 Insurance Exchange Bldg., Montreal.....	Cadillac Tp.
*Calder Bousquet Holdings, Ltd.....	5 St. James St. E., Montreal.....	Bousquet Tp.
*Canabec Exploration Company.....	Room 516, Canada Cement Bldg., Montreal.....	(Prospecting).
Canadian Malartic Gold Mines, Ltd.....	25 King St. W., Toronto, Ont.....	Fourniere Tp.
*Canadian Gold Mines, Ltd.....	18 Toronto St., Toronto, Ont.....	Cadillac Tp.
*Capital Traders, Ltd.....	Room 402-276 St. James St., Montreal.....	Chibougamau Dist.
*Celta Development & Mining Co., Ltd.....	Room 709-465 St. John St., Montreal.....	Senneville, Malartic and Duvernay Tps.
*Celta Quebec Exploration, Ltée.....	Room 709, 465 St. John St., Montreal.....	Senneville, Malartic and Duvernay Tps.
*Central Cadillac Gold Mines, Ltd.....	720 Transportation Bldg., Montreal.....	Cadillac Tp.
*Central Chibougamau Gold Mines, Ltd.....	Room 405, 276 St. James St., Montreal.....	Chibougamau Dist.
*Central Duvernay Gold Mines, Ltd.....	1010 St. Catherine St. W., Montreal.....	Duvernay Tp.
*Centrecour Gold Mines, Ltd.....	330 Bay St., Toronto, Ont.....	Louvencourt Tp.
*Centremaque Gold Mines, Ltd.....	Room 118, 276 St. James St. W., Montreal.....	Bourlamaque Tp.
*Chibmac Mines, Ltd.....	132 St. James St. W., Montreal.....	Barlow and Scott Tp. and Beauchastel Tp.
*Chibougamau Properties, Ltd.....	132 St. James St., Montreal.....	Chibougamau Dist.
*Churchill Mining & Milling Co., Ltd.....	604 Central Bldg., 45 Richmond St., Toronto, Ont.....	Cadillac Tp.
*Claveryn Gold Mines, Ltd.....	Room 823, Transportation Bldg., Montreal.....	Duvernay Tp.
*Clericy Consolidated Mines, Ltd.....	74 Sparks St., Ottawa, Ont.....	Joannes Tp.
*Clermo Mines, Ltd.....	74 Sparks St., Ottawa, Ont.....	Rouyn Tp.
*Colonial Gold Mines, Ltd.....	1410 Stanley St., Montreal.....	Dalquier Tp.
*Commander Mines, Ltd.....	715 Metropolitan Bldg., Toronto, Ont.....	Duvernay Tp.

DIRECTORY OF FIRMS—Continued

Name	Head office address	Location
Principal Operators (x) in Canadian Auriferous Quartz Mining Industry, 1937—Continued		
QUEBEC—Continued		
*Consolidated Chibougamau Goldfields, Ltd.	215 St. James St. W., Montreal	Chibougamau Dist.
*Consolidated Mining & Smelting Company of Canada, Limited	215 St. James St. W., Montreal	Chibougamau and other districts.
*Coronation Cadillac Gold Mines, Ltd.	806 Northern Ontario Bldg., Toronto, Ont.	Cadillac Tp.
Cournor Mining Co., Ltd.	Suite 110, 215 St. James St. W., Montreal	Louvicourt Tp.
*Courvak Gold Mines, Ltd.	407 McGill St., Montreal	Louvicourt and Vauquelin Tps.
*Cummings-Trudel Holdings, Ltd.	Val d'Or	Malartic and Barraute Tps.
*Deane-Cadillac Mining Corp.	360 St. James St. W., Montreal	Various.
*Delandore Mines, Ltd.	112 Yonge St., Toronto, Ont.	Delestré Tp.
*Dempsey-Cadillac Gold Mines, Ltd.	1008 Royal Bank Bldg., Toronto, Ont.	Cadillac and Malartic Tps.
*Descar Corporation, Ltd.	Room 204, 680 Sherbrooke St. W., Montreal	Destor Tp.
*Despina Gold Mines, Ltd.	201 Notre Dame St. W., Montreal	Duprat, Dufresnoy, Beauchastel and Rouyn Tps.
*Dillos Syndicate	Box 270, 92 Second Ave., Noranda	Desserat Tp.
*Dorval-Siscoe Mines, Ltd.	Val d'Or	Varsan Tp.
*Dubuissin Mines, Ltd.	Canada Cement Bldg., Montreal	Northwest Quebec.
*Dubuissin Goldfields, Ltd.	726 Insurance Exchange Bldg., Montreal	Dubuissin Tp.
*Dumico Gold Corporation	60 St. James St. W., Montreal	Duparquet Tp.
*Dunford (Quebec) Mines, Ltd.	Rouyn	Rouyn Tp.
*Duquesne Mines, Ltd.	80 King St. W., Toronto, Ont.	Duparquet and Destor Tps.
*Durbar Gold Mines, Ltd.	1417 Turks Head Bldg., Providence, R.I., U.S.A.	Rouyn area.
*Duverny-Dalquier Gold Mines Co., Ltd.	152 Notre Dame E., Montreal	Duverny and Dalquier.
*Duverny Goldfields Corp.	60 St. James St. W., Montreal	Canton Duverny.
*East Malartic Mines, Ltd.	355 St. James St. W., Montreal	Fournière Tp.
*East Rouyn Gold Mines, Ltd.	603 Royal Bank Bldg., Toronto, Ont.	Rouyn Tp.
*Eclipse Gold Mining Co., Ltd.	201 Notre Dame St. W., Montreal	Destor Tp.
*Emperor Gold Syndicate	Room 704, 357 Bay St., Toronto, Ont.	Villebon Tp.
*Erie Canadian Mines, Ltd.	Box 670, Kirkland Lake, Ont.	Chanzel Tp.
*Farrell Rouyn Mines, Ltd.	2800/25 King St. W., Toronto, Ont.	Rouyn Tp.
*Fleming Mines, Ltd.	215 St. James St. W., Montreal	Louvicourt Tp.
*Fleming Thompson Gold Mines, Ltd.	P.O. Box 308, Rouyn	Duparquet Tp.
*Fontana Gold Mines, Ltd.	Room 822, Transportation Bldg., Montreal	Duverny Tp.
*Francoeur Gold Mines, Ltd.	491 Dominion Square Bldg., Montreal	Beauchastel Tp.
*Freegold Mines, Ltd.	Room 100, 45 St. James St., Montreal	Launay Tp.
*Gale Gold Mines, Ltd.	489 Ouellette Ave., Windsor, Ont.	Dubuissin Tp.
*Gignac Gold Mines, Ltd.	Rouyn	Desserat Tp.
*Gilman Exploration, Ltd.	Room 719, 276 St. James St. W., Montreal	Various.
*Gilson Duverny Gold Mines, Ltd.	405 Dominion Square Bldg., Montreal	Duverny Tp.
*Gold Bar Mines (Quebec, Ltd.	244 Bay St., Toronto, Ont.	Rouyn Tp.
*Gold Quartz Mining Corp., Ltd.	26 Queen St. E., Toronto, Ont.	Varsan Tp.
*Goldstream Mining Company, Ltd.	Room 3, 9 Toronto St., Toronto, Ont.	Rouyn.
*Granada Gold Mines, Ltd.	244 Bay St., Toronto, Ont.	Rouyn Tp.
*Granby-Kent Gold Mines, Ltd.	1209 Ducharme St., Montreal	Varsan Tp.
*Grenadier Gold Mines, Ltd.	1008 Royal Bank Bldg., Toronto, Ont.	Duverny Tp.
*Haller, Bruce A.	Kirkland Lake, Ont.	Beauchastel and Duprat Tp.
*Halliwell Gold Mines, Ltd.	360 St. James St. W., Montreal	Beauchastel Tp.
*Harpers Malartic Gold Mines, Ltd.	Transportation Bldg., Montreal	Dubuissin Tp.
*Harricana Amalgamated Gold Mines, Inc.	56 St. Peter St., Quebec	Dubuissin Tp.
*Harricana Basin Mining Co.	Box B, Amos	Various.
*Hayes Cadillac Mines, Ltd.	18 Toronto St., Toronto	Cadillac Tp.
*Heva Cadillac Gold Mines, Ltd.	1008 Royal Bank Bldg., Toronto, Ont.	Courville Tp.
*Higginson Gold Mines, Ltd.	Room 606, 407 McGill St., Montreal	Varsan Tp.
*Higg-Varsan Syndicate	1306 Star Bldg., Toronto, Ont.	Varsan Tp.
*Inspiration Mining & Development Co., Ltd.	P.O. Box 187, Amos	Various.
Jacola Mines, Ltd.	Val d'Or	Dubuissin Tp.
*Jacques Cartier Mining Corporation	215 St. James St. W., Montreal	Bourlamaque Tp.
*Joannes-Davidson Mines, Ltd.	276 St. James St. W., Montreal	Joannes Tp.
*Joannes Gold Mines, Ltd.	New Liskeard	Joannes and Bousquet Tps.
*Jupiter Gold Syndicate	330 Bay St., Toronto, Ont.	Rouyn area.
*Kanasuta Gold Mines, Ltd.	617 Confederation Life Bldg., Toronto, Ont.	Duparquet and Hebecourt Tps.
*Kegamione Development & Mining Co., Ltd.	18 Toronto St., Toronto, Ont.	Privat Tp.
*Keko (Quebec) Gold Mines, Ltd.	P.O. Box 53, Arntfield	Beauchastel Tp.
*Kewagama Gold Mines (Quebec), Ltd.	Kewagama	Cadillac Tp.
*Kiwa Gold Mines, Ltd.	Room 1201, 302 Bay St., Toronto, Ont.	Dubuissin Tp.
*Kyroco Gold Mining Co., Ltd.	288 Bay St., Toronto, Ont.	Rouyn Tp.
*Kindale Mines, Ltd.	217 University Tower Bldg., Montreal	Rouyn Tp.
*Kirkfield Mines, Ltd.	Room 3, 9 Toronto St., Toronto, Ont.	Rouyn Tp.
*Kirkland Hudson Bay Gold Mines, Ltd.	New Liskeard, Ont.	Blondeau and Guillet Tps.
*Kirkmac Mining Company	Val d'Or	Bourlamaque Tp.
*Kongor Mines Corporation	625 Burnside Place, Montreal	Dalquier Tp.
*Lacoma Gold Mine (Quebec), Ltd.	Senneterre	Tavernier Tp.
*Lac Varsan Gold Mines, Ltd.	Room 2101, Aldred Bldg., Montreal	Varsan Tp.
*Lake Rose Mines, Ltd.	80 King St. W., Toronto, Ont.	Currie Tp.
*Lake Montigny Gold Mines, Ltd.	Room 2134, 276 St. James St. W., Montreal	Varsan Tp.
*Lamaque Mining Co., Ltd.	Bourlamaque	Bourlamaque Tp.
*La Mine d'Or Champlain, Ltée	Arntfield	Beauchastel Tp.
*Lander Gold Mines, Ltd.	221 Notre Dame St. W., Montreal	Varsan Tp.
*Lapa Cadillac Gold Mines, Ltd.	Suite 2529, 25 King St. W., Toronto 2, Ont.	Cadillac Tp.
*La Pause Cold Mining Corp. Ltd.	5660 Park Ave., Montreal	La Pause Tp.
*La Reine Gold Mines, Ltd.	305 C. P. R. Bldg., Toronto, Ont.	La Reine Tp.
*Lavalie Mines (Quebec), Ltd.	465 St. John St., Montreal	Bourlamaque Tp.

DIRECTORY OF FIRMS—Continued

Name	Head office address	Location
Principal Operators (x) in Canadian Auriferous Quartz Mining Industry, 1937—Continued		
QUEBEC—Continued		
*Leroy Mines, Ltd.	266 St. James St. W., Montreal.	Cléry Tp.
*Louvast Gold Mines, Ltd.	407 McGill St., Montreal.	Louvicoourt Tp.
*Louvre Gold Mines, Ltd.	407 McGill St., Montreal.	Louvicoourt Tp.
*Mainland Chibougamau Mines, Ltd.	Room 325, 132 St. James St. W., Montreal.	Chibougamau Dist.
*Malartic Gold Fields, Ltd.	P.O. Box 667, Place d'Armes, Montreal.	Malartic Tp.
*Malartic Lakeshore Mines, Ltd.	Room 221, 276 St. James St., Montreal.	Malartic Tp.
*Malco Explorations, Ltd.	1010 St. Catherine St. W., Montreal.	Roy and McCorkill Tps.
*Manitou Mines (Quebec), Ltd.	190 Main St., Hull.	Bourlamaque Tp.
*Maniwaki Mines, Ltd.	811, 67 Yonge St., Toronto, Ont.	Vauquelin Tp.
*Mariette Gold Mines, Ltd.	113, 2nd Ave., Amos.	Courville Tp.
*Marjac Gold Mines.	La Sarre.	Desmeloizes Tp.
*Marva Gold Mines.	503/357 Bay St., Toronto, Ont.	Bousquet Tp.
*Mary Jane Copper Gold Mines, Ltd.	Room 409, 1010 St. Catherine St. W., Montreal.	Destor Tp.
*McDonough Mining Syndicate Ltd.	67 Yonge St., Toronto, Ont.	Vauquelin Tp.
*McKay (Quebec) Exploration Ltd.	215 St. James St. W., Montreal.	Scott Tp.
*McRae Gold Mines, Ltd.	4060 St. Laurent Blvd., Montreal.	Senneville and Varsan Tps.
*McWatters Gold Mines, Ltd.	Drawer 988, Haileybury, Ont.	Rouyn Tp.
*Midland Mining Corporation, Ltd.	31 St. James St. W., Montreal.	McKenzie and Demeloizes Tps.
*(Midway Malartic Gold Mines Ltd.)	Room 204, 80 Richmond St. W., Toronto, Ont.	Fournière Tp.
*(Milway Malartic (Quebec), Ltd.)	P.O. Box 55, Arnfield.	Beauchastel Tp.
*Minelands (Quebec), Ltd.	189 St. John St., Quebec.	Landrienne Tp.
*Mines Development Corp.	P.O. Box 698, Rouyn.	Beauchastel Tp.
*Mines d'Or Provencher.	P.O. Box 184, Rouyn.	Destor and Clermont Tps.
*Mineseecker Forgold, Ltd.	132 St. James St. W., Montreal.	Duvernay Tp.
*Mines Holding, Ltd.	Suite 602, 350 Bay St., Toronto, Ont.	Various.
*Mining Corporation of Canada, Ltd.	Suite 1209, 330 Bay St., Toronto, Ont.	Dasserat Tp.
*Monarch Mines, Ltd.	25 King St. W., Toronto, Ont.	Bousquet Tp.
*Mooshla Gold Mines Co., Ltd.	10 Adelaide St. E., Toronto, Ont.	Bourlamaque Tp.
*Mylamaque Gold Mines.	215 St. James St., Montreal.	Fournière and Malartic Tps.
*National Malartic Mining Co., Ltd.	338 St. James St., Montreal.	Joannes Tp.
*Nelson Gold Mines, Ltd.	Rouyn.	Beauchastel Tp.
*Niagara Gold Mines, Ltd.	Excelsior Life Bldg., Toronto, Ont.	Destor and Beauchastel Tps.
*Nipissing Mining Co. Ltd.	25 King St. W., Toronto, Ont.	Bousquet Tp.
*Norgold Mines Ltd.	Three Rivers.	Bousquet Tp.
*Northern Quebec Goldfield & Exploration Co.	1 Toronto St., Toronto, Ont.	Haig Tp.
*North King Gold Syndicate.	132 St. James St. W., Montreal.	Duvernay Tp.
*Norwin Holdings, Ltd.	Room 216, 215 St. James St., Montreal.	Louvicoourt Tp.
*Nubell Gold Mines, Ltd.	Room 709, 465 St. John St., Montreal.	Bourlamaque Tp.
*Numaque Mining Co., Ltd.	Kewagama.	Cadillac Tp.
*O'Brien Gold Mines, Ltd.	231 St. James St., Montreal.	Beauchastel, Bousquet and Rouyn Tps.
*O'Hara Gold Mines, Ltd.	14 Ninth St., Noranda.	Cadillac Tp.
*O'Leary Malartic Mines, Ltd.	1112 Star Bldg., Toronto, Ont.	Louvicoourt Tp.
*Olympic Cadillac Gold Mines.	Room 503, 357 Bay St., Toronto, Ont.	Beauchastel Tp.
*Orcour Gold Mines.	P.O. Box 54, Arnfield.	Cadillac Tp.
*Orland Gold Mines (Quebec), Ltd.	407 McGill St., Montreal.	Cadillac Tp.
*Pan-Canadian Mines, Ltd.	Box 700, New Liskeard, Ont.	Cadillac Tp.
*Pandora Cadillac Gold Mines, Ltd.	71 rue St. Pierre, Quebec.	Malartic Tp.
*Paquette Malartic (Quebec) Mines, Ltd.	1463 Sun Life Bldg., Montreal.	Louvicoourt Tp.
*Paradis Mining Corporation.	617 Confederation Life Bldg., Toronto, Ont.	Malartic Tp.
*Partanen Malartic Gold Mines, Ltd.	Val d'Or.	Bourlamaque Tp.
*Payore Holdings Co., Ltd.	25 King St. W., Toronto 2, Ont.	Rouyn Tp.
*Pelletier Lake Gold Mines, Ltd.	Perron.	Senneville and Pascalis Tps.
*Perron Gold Mines, Ltd.	56 St. Peter St., Quebec.	Pershing Tp.
*Pershing-Manitou Gold Mines, Ltd.	20 St. James St. E., Montreal.	Cadillac Tp.
*Plaindore Mines Co.	100 Adelaide St. W., Toronto, Ont.	Rouyn Tp.
*Pontiac Rouyn Mines, Ltd.	P.O. Box 300, Noranda.	Rouyn Tp.
*Powell Rouyn Gold Mines, Ltd.	629/67 Yonge St., Toronto, Ont.	Rouyn Tp.
*Pre-Cambrian Prospectors, Ltd.	80 King St. W., Toronto, Ont.	Various.
*Prospectors Airways Co., Ltd.	Room 707, 465 St. John St., Montreal.	Dubuisson Tp.
*Quebec Exploration, Ltée.	Room 115, 1410 Stanley St., Montreal.	North Hatley.
*Quebec United Mines, Ltd.	Room 1507, Victory Bldg., Toronto, Ont.	Fournière Tp.
*Que Martic Mines, Ltd.	Room 310, Confederation Bldg., Montreal.	Rouyn, Joannes and Vauquelin Tps.
*Questor Gold Mines, Ltd.	713 Tramways Bldg., Montreal.	Rouyn Tp.
*Red Gold Mining Company, Ltd.	132 St. James St. W., Montreal.	Duvernay Tp.
*Reynolds, G. H. (Quebec Gold Mines, Ltd.)	Room 35, 455 St. François Xavier St., Montreal.	Dubuisson Tp.
*Ricanaw Mines, Ltd.	1306 Star Building, Toronto, Ont.	Dubuisson Tp.
*Roedor Gold Mines, Ltd.	Box 29, Taschereau.	Launay Tp.
*Rochette Gold Mines Co., Ltd.	660 St. Catherine St. W., Montreal.	Chibougamau Tp.
*Rouleau Mines, Ltd.	330 Bay St., Toronto, Ont.	Rouyn Tp.
*Rouyn Reward Gold Mines, Ltd.	266 St. James St. W., Montreal.	Routhier, Cadillac Tps.
*Routhier Cadillac Gold Mines, Ltd.	Room 402, 276 St. James St., Montreal.	Cadillac and Scott Tps.
*Tubee Mines, Ltd.	4 Notre Dame St. E., Montreal.	Duprat Tp.
*Saint Jude Gold Mines, Ltd.	6720 Sherbrooke St. E., Montreal.	Cadillac Tp.
*St. Pierre Cadillac Gold Mines, Ltd.	215 St. James St. W., Montreal.	Chibougamau Dist.
*Scott Chibougamau Mines, Ltd.	Room 310, Confederation Bldg., Montreal.	Rouyn Tp.
*Seguin Rouyn Gold Mines, Ltd.	Room 2, 187 Main St., Hull.	Beauchastel Tp.
*Sennator Mines, Ltd.	Val d'Or.	Varsan Tp.
*Sennevar Mines, Ltd.		

DIRECTORY OF FIRMS—Continued

Name	Head office address	Location
Principal Operators (x) in Canadian Auriferous Quartz Mining Industry, 1937—Continued		
QUEBEC—Concluded		
*Senore Gold Mines, Ltd.	Perron.	Senneville and Pascalis Tps.
Shawkey Gold Mining Co., Ltd.	Imperial Bank Bldg., Toronto, Ont.	Dubuisson Tp.
*Shawmaque Gold Mines Ltd.	660 St. Catherine St. W., Montreal.	Dubuisson Tp.
Sigma Mines (Quebec), Ltd.	Bourlamaque.	Bourlamaque Tp.
*Sim Clerc Gold Mines, Ltd.	Room 25, 84 Notre Dame St. W., Montreal.	Louvicoirt Tp.
*Siscoe Extension Gold Ltd.	Siscoe P.O.	Varsan Tp.
Siscoe Gold Mines, Ltd.	907 Dominion Square Bldg., Montreal.	Varsan and Dubuisson Tps.
*Sladen-Malartic Mines, Ltd.	63 Sparks St., Ottawa, Ont.	Cadillac and Fournière Tps.
*Soma-Duverny Gold Mines, Ltd.	132 St. James St. W., Montreal.	Duverny Tp.
*South Malartic Gold Mines, Ltd.	Room 1101, 231 St. James St. W., Montreal.	Fournière Tp.
*South Shore, Ltd.	465 St. John St., Montreal.	Malartic, Tp.
Stadacona Rouyn Mines, Ltd.	719 Tramways Bldg., Montreal.	Rouyn Tp.
*Standard Gold Mines, Ltd.	1604 Aldred Bldg., 507 Place d'Armes, Montreal.	Bourlamaque Tp.
*Sturgeon Goldfields, Ltd.	Room 409, 1010 St. Catherine St. W., Montreal.	Rouyn and Destor Tps.
*Sudbury Contact Mines, Ltd.	Suite 2529, 25 King St. W., Toronto, Ont.	Bousquet Tp.
*Sulco Gold Mines, Ltd.	Toronto, Ont.	Dubuisson Tp.
Sullivan Consolidated Mines, Ltd.	1604 Aldred Bldg., Montreal.	Dubuisson Tp.
*Syndicat des Mines d'or Matchi-Manitou Ltée.	56 St. Peter St., Quebec.	Vauquelin Tp.
*Thompson Bousquet Gold Mines, Ltd.	Room 98, 388 St. James St. W., Montreal.	Bousquet Tp.
Thompson Cadillac Mining Corporation.	Room 98, 388 St. James St. W., Montreal.	Kewagama.
*Tiblemont Island Mining Co. Ltd.	Tiblemont Island, Senneville.	Tiblemont Tp.
*Turno Cadillac Gold Mines, Ltd.	Room 31, 18 Toronto St., Toronto, Ont.	Bousquet Tp.
*Twin City Incorporated.	Room 409, 1010 St. Catherine St. W., Montreal.	Beauchastel Tp.
*Valbec Exploration, Ltd.	102, 60 St. James St., Montreal.	Bourlamaque, Louvicoirt Tp.
*Valcoo Cadillac Mines, Ltd.	65 St. Peter St., Quebec.	Cadillac Tp.
*Val d'Or Mineral Holdings.	25 King St. W., Toronto, Ont.	Bourlamaque Tp.
*Val d'Or Mines, Ltd.	P.O. Box 913, Val d'Or.	Louvicoirt.
*Valmae Gold Mines, Ltd.	Room 2102, Aldred Bldg., Montreal.	Bourlamaque Tp.
*Val Malartic Gold Mines, Ltd.	330 Bay St., Toronto, Ont.	Fournier Tp.
*Varsan Gold Mines (Quebec), Ltd.	372 Bay St., Toronto, Ont.	Varsan Tp.
*Wawbano Mines, Ltd.	Room 411a, 132 St. James St., Montreal.	Roy Tp.
*West Duverny Gold Mines, Ltd.	1010 St. Catherine St. W., Montreal.	Duverny Tp.
*West Siscoe Gold Mines, Ltd.	907 Dominion Square Bldg., Montreal.	Varsan Tp.
*Westwood Cadillac Mines, Ltd.	Suite 803, 437 St. James St. W., Montreal.	Bousquet Tp.
*Wildor Mines, Ltd.	23½ Duncan Ave., Kirkland Lake, Ont.	Bourlamaque Tp.
*Wisik Gold Mines, Ltd.	Room 1201, 302 Bay St., Toronto, Ont.	Dubuisson Tp.
*Wolverine (Quebec) Mines, Ltd.	Rouyn.	Bourlamaque Tp.
*Wood Cadillac Mines.	437 St. James St. W., Montreal.	Cadillac Tp.
*Yates United Mines, Ltd.	132 St. James St. W., Montreal.	Dubuisson and Montcalm Tps.
*Ypres Cadillac Mines, Ltd.	Suite 45, 171 Yonge St., Toronto, Ont.	Cadillac Tp.
ONTARIO—Porcupine District		
Anca Mines, Ltd.	24 Jarvis St., Fort Erie.	Garrison Tp.
*Augite Porcupine Mines, Ltd.	357 Bay St., Toronto.	Deloro Tp.
Buffalo Ankerite Gold Mines, Ltd.	South Porcupine.	South Porcupine.
Coniaurum Mines, Ltd.	25 King St. W., Toronto.	Schumacher.
*Consolidated Mining and Smelting Company of Canada, Limited.	215 St. James St., Montreal, P.Q.	Garrison Tp.
Delnite Mines, Ltd.	P.O. Box 590, Timmins.	Deloro Tp.
*Delwin Mines, Ltd.	806 Dun Bldg., Buffalo, N.Y., U.S.A.	Deloro Tp.
*De Santie Porcupine Mines, Ltd.	42½ Second Ave., Timmins.	Ogden Tp.
*Devon Gold Mines, Ltd.	1809 Royal Bank Bldg., Toronto.	Painkiller Lake.
Dome Mines, Ltd.	36 Toronto St., Toronto.	South Porcupine.
*Electra Porcupine Gold Mines, Ltd.	29 Melinda St., Toronto.	Stock, German and Macklem Tps.
Gillies Lake Porcupine Gold Mines, Ltd.	Suite 20-21, 9 Toronto St., Toronto, Ont.	Timmins.
*Guy-Guibord Gold Mines, Ltd.	706 Concourse Bldg., Toronto.	Michaud Tp.
*Hallnor Mines, Ltd.	1600 Royal Bank Bldg., Toronto.	Whitney Tp.
*Hislop Gold Mines, Ltd.	Room 503, 357 Bay St., Toronto.	Hislop Tp.
Hollinger Consolidated Gold Mines, Ltd.	Timmins.	Hislop Tp. and Timmins.
*Hugh-Pam Porcupine Mines, Ltd.	51 King St. W., Toronto.	Whitney Tp.
*Kendou Porcupine Mines, Ltd.	706 Concourse Bldg., Toronto.	Porcupine and Larder Lake Dists.
Mace Gold Mines, Ltd.	Schumacher.	Timmins.
McIntyre Porcupine Mines, Ltd.	Schumacher.	Schumacher.
McLaren Porcupine Gold Mines, Ltd.	South Porcupine.	Deloro Tp.
*Mohawk Porcupine Gold Mines, Ltd.	205/200 Bay St., Toronto.	Whitney Tp.
*Moneta Porcupine Mines Co.	67 Yonge St., Toronto.	Timmins.
Naybob Gold Mines, Ltd.	711 Federal Bldg., Toronto.	Ogden and Deloro Tps.
*Orpit Mines, Ltd.	67 Yonge St., Toronto.	Porcupine Dist.
Pamour Porcupine Mines, Ltd.	Pamour.	Whitney Tp.
Paymaster Consolidated Mines, Ltd.	Box 508, South Porcupine.	Deloro and Tisdale Tps.
Porcupine Lake Gold Mining Co., Ltd.	112 Yonge St., Toronto.	Whitney Tp.
*Porcupine McNabb Gold Mines, Ltd.	Haileybury.	Macklem Tp.
*Porcupine Triumph Gold Mines, Ltd.	812 Kent Bldg., 156 Yonge St., Toronto.	Deloro Tp.
*Preston East Dome Mines, Ltd.	706 Concourse Bldg., Toronto.	South Porcupine.
*Ramore Gold Mining Co., Ltd.	305 C. P. R. Bldg., Toronto.	Playfair Tp.
*Solidago Mining Co., Ltd.	15 King St. W., Toronto.	Tisdale Tp.
*South Dome Lake Mines, Ltd.	204 McKinnon Bldg., Toronto.	Tisdale Tp.
*Verity Porcupine Gold Mines, Ltd.	Timmins.	Porcupine Dist.

DIRECTORY OF FIRMS—Continued

Name	Head office address	Location
Principal Operators (x) in Canadian Auriferous Quartz Mining Industry, 1937—Continued		
ONTARIO—Kirkland-Larder Lakes District		
*Arjion Gold Mines, Ltd.	26 Adelaide St. W., Toronto.	Larder Lake Dist.
*Armistice Gold Mines, Ltd.	706 Concourse Bldg., Toronto.	McGarry Tp.
*Barber Larder Gold Mines, Ltd.	372 Bay St., Toronto.	McGarry Tp.
*Bidgood Kirkland Gold Mines, Ltd.	Suite 602, 350 Bay St., Toronto.	Lebel Tp.
*Boyd Kirkland Gold Mines, Ltd.	112 Yonge St., Toronto.	Kirkland Lake.
*Capital Rouyn Gold Mines, Ltd.	301 First Ave., Ottawa.	Larder Lake.
*Chesterville Larder Lake Gold Mining Co., Ltd.	330 Bay St., Toronto.	Larder Lake.
*Consolidated Mining and Smelting Company of Canada, Ltd.	215 St. James St. W., Montreal, P.Q., Kirkland Lake.	Gauthier Tp.
*Continental Kirkland Mines, Ltd.	Kirkland Lake.	Gull Lake.
*Crescent Kirkland Gold Mines, Ltd.	902 Kent Bldg., 156 Yonge St., Toronto.	Teck Tp.
*Federal Kirkland Mining Co., Ltd.	1116 Federal Bldg., Toronto.	Kirkland Lake.
*Glenora Gold Mines, Ltd.	1101 Federal Bldg., Toronto.	Gull Lake.
*Golden Gate Mining Co., Ltd.	66 King St. W., Toronto.	Swastika.
*Golden Summit Mines, Ltd.	2374 Bloor St. W., Toronto.	Seselinika.
*Golden Rex Kirkland Mines, Ltd.	Suite 600, 11 King St. W., Toronto.	Kirkland Lake.
*Goodfish Mining Co., Ltd.	Box 996, Kirkland Lake.	Kirkland Lake Dist.
*Gordon-Lebel Mines, Ltd.	67 Yonge St., Toronto.	Lebel Tp.
*Grenfell Goldfields, Ltd.	Room 405, 276 St. James St. W., Montreal, P.Q.	Grenfell Tp.
*Ivan-Larder Mines, Ltd.	405 Concourse Bldg., Toronto.	McGarry Tp.
*Kerr-Addison Gold Mines, Ltd.	38 King St. W., Toronto.	Larder Lake.
*Kirana Kirkland Gold Mines, Ltd.	1009 Royal Bank Bldg., Toronto.	Kirkland Lake.
*Korola Larder Mines, Ltd.	Box 967, Kirkland Lake.	Hearst Tp.
*Kirkland Gold Rand, Ltd.	Kirkland Lake.	Teck Tp.
*Kirkland Hudson Bay Gold Mines, Ltd.	New Liskeard.	Teck Tp.
*Kirk King Mines, Ltd.	902 Kent Bldg., Toronto.	Lebel Tp.
*Kirkland Basin Gold Mines, Ltd.	Room 1311, 44 Victoria St., Toronto.	Teck Tp.
*Kirkland Lake Gold Mining Co., Ltd.	Kirkland Lake.	Teck Tp.
*Lakeside-Kirkland Gold Mines, Ltd.	106 Dunker Bldg., Kitchener.	Kirkland Lake.
*Lake Shore Mines, Ltd.	Kirkland Lake.	Kirkland Lake.
*Larr-Add Mines, Ltd.	1003 Northern Ontario Bldg., Toronto.	Larder Lake.
*Lardego Gold Mines, Ltd.	80 Richmond St. W., Toronto.	McVittie Tp.
*Macassa Mines, Ltd.	1001 Federal Bldg., Toronto.	Kirkland Lake.
*Martin-Bird Gold Mines, Ltd.	200 Bay St., Toronto.	Hearst Tp.
*McInnis-Kirkland Gold Mines, Ltd.	11 King St. W., Toronto.	Scadding Tp.
*Mid-Kirk Gold Mines, Ltd.	94 Sun Life Bldg., Toronto.	Lebel Tp.
*Mitchell-Hearst Gold Syndicate, Ltd.	702 General Assurance Bldg., Toronto.	Larder Lake.
*Moffatt-Hall Mining Co., Ltd.	357 Bay St., Toronto.	Lebel Tp.
*Morris-Kirkland Gold Mines, Ltd.	902 Kent Bldg., Toronto.	Lebel Tp.
*Omega Gold Mines, Ltd.	15 King St. W., Toronto.	McVittie Tp.
*Oriole Mines, Ltd.	Room 1006, 45 Richmond St. W., Toronto.	Gauthier Tp.
*Pelangio-Larder Mines, Ltd.	Box 967, Kirkland Lake.	McGarry Tp.
*Raven River Mines, Ltd.	67 Yonge St., Toronto.	Larder Lake.
*Security Gold Mines, Ltd.	Box 333, Uxbridge.	Boston Tp.
*Swastika Kirkland Gold Mines, Ltd.	Box 554, Ottawa.	Swastika.
*Sylvanite Gold Mines, Ltd.	Box 670, Kirkland Lake.	Kirkland Lake.
*The Teck Hughes Gold Mines, Ltd.	Kirkland Lake.	Kirkland Lake.
*Toburn Gold Mines, Ltd.	1809 Royal Bank Bldg., Toronto.	Kirkland Lake.
*Upper Canada Mines, Ltd.	1402 Victory Bldg., Toronto.	Kirkland Lake.
*Virgo Larder Mines, Ltd.	706 Concourse Bldg., Toronto.	Hearst Tp.
*Wesley Gold Mines, Ltd.	1212, 320 Bay St., Toronto.	Larder-Lake, Sturgeon River.
Wright Hargreaves Mines, Ltd.	Fort Erie North.	Kirkland Lake.
Yama Gold Mines.	Suite 45, 171 Yonge St., Toronto.	Catherine Tp.
ONTARIO—Others		
*Ackerman Gold Mines, Ltd.	P.O. Box "G," Marmora.	Marmora.
*Alcona Mines, Ltd.	372 Bay St., Toronto.	Alcona.
*Alden-Goudreau Mines, Ltd.	608 Excelsior Life Bldg., Toronto.	Goudreau Dist.
*Algoid Mines, Ltd.	604, 45 Richmond St. W., Toronto.	Goudreau Dist.
*Algoma Summit Gold Mines, Ltd.	514 McKinnon Bldg., Toronto.	Goudreau Dist.
*Albany River Mines, Ltd.	Haileybury.	Patricia Dist.
*Altura Gold Mines, Ltd.	67 Yonge St., Toronto.	Patricia Dist.
*Aquarius Porcupine Gold Mines, Ltd.	706 Concourse Bldg., Toronto.	Macklem and German Tps
*Argosy Gold Mines, Ltd.	1320 Metropolitan Bldg., Toronto.	Patricia Dist.
*Bankfield Consolidated Mines, Ltd.	1006 Concourse Bldg., Toronto.	Errington Tp.
*Berens River Mines, Ltd.	Empire.	Patricia Dist.
*Big Master Consolidated Gold Mines, Ltd.	112 Yonge St., Toronto.	Kenora Dist.
*Billmae Gold Mines, Ltd.	357 Bay St., Toronto.	MacMurchy Tp.
*Bloom Lake Consolidated Mines, Ltd.	330 Bay St., Toronto.	Matachewan Tp.
*Blue Jay Long Lac Gold Mines, Ltd.	203 Royal Bank Bldg., Toronto.	Schreiber Dist.
*Bousquet Gold Mines, Ltd.	171 Yonge St., Toronto.	Sudbury Dist.
*Brenfold Mines, Ltd.	34 King St. E., Toronto.	Sturgeon River area.
*Brennan & Kenty Bros. Prospecting Co., Ltd.	Room 1309, 44 Victoria St., Toronto.	Various.
*Britcana Gold Mines, Ltd.	1701 Star Bldg., Toronto.	Bryce Tp.
*Caramat Gold Mines, Ltd.	Room 714, 320 Bay St., Toronto.	Little Long Lac.
*Car Lake Syndicate	519 Ottawa Electric Bldg., Ottawa.	Skinner Tp.
*Central Patricia Gold Mines, Ltd.	Central Patricia, P.O.	Connell Tp.
*Chien D'Or Exploration, Ltd.	112 Yonge St., Toronto.	Various.
*Cline Lake Gold Mines, Ltd.	Box 939, Cobalt.	Algoma, Dist.
*Coin Lake Gold Mines, Ltd.	357 Bay Street, Toronto.	Red Lake Dist

DIRECTORY OF FIRMS—Continued

Name	Head office address	Location
Principal Operators (x) in Canadian Auriferous Quartz Mining Industry, 1937—Continued		
ONTARIO—Others—Continued		
*Consolidated Mining & Smelting Company of Canada, Limited.....	215 St. James St. W., Montreal, P.Q.....	Cordova Mines, Temagami, Addington Co. Thunder Bay Dist.
Cook Lake Gold Mines, Ltd.....	1103 Atlas Bldg., 350 Bay St., Toronto.....	Kenora M.D. Michipicooten Dist.
Darkwater Mines, Ltd.....	1001 Federal Bldg., Toronto.....	Algoma Dist.
Darwin Gold Mines, Ltd.....	304 Bay St., Toronto.....	Red Lake.
Deep Lake Gold Mine Syndicate.....	109 North Union St., Akron, Ohio, U.S.A.....	Patricia Dist.
*Derlak Red Lake Gold Mines, Ltd.....	514 McKinnon Bldg., Toronto.....	Turnbull Tp.
*Dickson-Sachigo Gold Mines, Ltd.....	201 Somerset Bldg., Winnipeg, Man.....	Lochalsh.
*Digby Dome Mines Co., Ltd.....	80 Richmond St. W., Toronto.....	Kowkash M.D.
*Dog Lake Syndicate.....	Room 405, Ottawa Electric Bldg., Ottawa.....	Atikokan.
*Edgelake Gold Mining Co., Ltd.....	254, 1st Ave., Schumacher.....	Goldrock.
Edwards Gold Mines, Ltd.....	231 South LaSalle St., Chicago, Ill., U.S.A.....	(exploration)
*Elizabeth Gold Mining Co., Ltd.....	702 Kent Bldg., Toronto.....	Beardmore and Coyle Lake.
Elora Gold Mines, Ltd.....	603 Royal Bank Bldg., Toronto.....	Falconbridge Tp.
*Erie Canadian Mines, Ltd.....	Box 670, Kirkland Lake.....	Patricia Dist.
*Eva Lake Gold Mines, Ltd.....	910, 36 Toronto St., Toronto.....	Skinner Tp.
*Falcon Gold Mines, Ltd.....	205/200 Bay St., Toronto.....	Red Lake.
*Frontier Red Lake Gold Mines, Ltd.....	701 National Bldg., Toronto.....	Patricia Dist.
*Gleamar Gold Mines, Ltd.....	330 Bay St., Toronto.....	Red Lake.
Gold Eagle Gold Mines, Ltd.....	518 Federal Bldg., Toronto.....	Patricia Dist.
*Golden Arm Mines, Ltd.....	701 National Bldg., Toronto.....	Ashmore Tp.
*Hard Rock Gold Mines, Ltd.....	Geraldton.....	Sudbury Dist.
*Hardwood Lake Mines, Ltd.....	52 Spadina Ave., Toronto.....	Algoma Dist.
Hiawatha Gold Mines, Ltd.....	Suite 303, Dominion Bldg., Toronto.....	Powell Tp.
Hollinger Consolidated Gold Mines, Ltd.....	Timmins.....	Red Lake.
Howey Gold Mines, Ltd.....	Red Lake.....	Patricia Dist.
*Hudson Patricia Gold Mines, Ltd.....	Sioux Lookout.....	Hutchison Lake.
*Hutchison Lake Gold Mines, Ltd.....	200 Bay St., Toronto.....	Hutchison Lake.
*Hutchineau Gold Mines, Ltd.....	330 Bay St., Toronto.....	Dist. of Patricia.
*Interlac Gold, Ltd.....	116 Dalhousie St., Brantford.....	Geraldton.
Jellicoe Consolidated Gold Mines, Ltd.....	1101 Federal Bldg., Toronto.....	Patricia Dist.
J. M. Consolidated Gold Mines, Ltd.....	1116 Federal Bldg., Toronto.....	Temiskaming Dist.
*Jowsey Denton Gold Mines, Ltd.....	Room 1701, 372 Bay St., Toronto.....	Patricia Dist.
*Kaw-Crow Patricia Gold Mines, Ltd.....	304 Bay St., Toronto.....	Kenora Dist.
*Kenbrae Gold Mines, Ltd.....	11 King St. W., Toronto.....	Kenora.
*Kenecho Gold Mines, Ltd.....	372 Bay St., Toronto.....	Kenora Dist.
*Kenland Gold Mines, Ltd.....	36 Toronto St., Toronto.....	Geraldton.
*Kenogamisis Gold Mines, Ltd.....	357 Bay St., Toronto.....	Kenora Dist.
*Kenricia Gold Mines, Ltd.....	25 King St. W., Toronto.....	Hutchison Lake.
*Lack Teck Gold Mines, Ltd.....	205 Brock Bldg., 200 Bay St., Toronto.....	Little Long Lac area.
*Lafayette Long Lac Gold Mines, Ltd.....	200 Bay St., Toronto.....	Hutchison Lake.
*Lake Head Gold Mines, Ltd.....	200 Bay St., Toronto.....	Shining Tree Dist.
*Lake Caswell Mines, Ltd.....	1465 Yonge St., Toronto.....	Red Lake Dist.
*Lake Rowan Gold Mines, Ltd.....	1175 Phillips Place, Montreal, P.Q.....	Kenora Dist.
*Lakeport Gold Mines, Ltd.....	404 Public Utilities Bldg., Port Arthur.....	Patricia Dist.
*Lansdowne Minerals, Ltd.....	702 Central Bldg., Toronto.....	Sudbury Dist.
Lebel Ore Mines, Ltd.....	320 Bay St., Toronto.....	Beardmore.
Leitch Gold Mines, Ltd.....	67 Yonge St., Toronto.....	Little Long Lac.
Little Long Lac Gold Mines, Ltd.....	1331/25 King St. W., Toronto.....	Patricia Dist.
Luxor Red Lake Mines Dist.....	705 National Bldg., Toronto.....	Patricia Dist.
*MacAndrew Red Lake Gold Mines, Ltd.....	100 Adelaide St. W., Toronto.....	Little Long Lac area.
*MacFarlane Long Lac Gold Mines, Ltd.....	760 Excelsior Life Bldg., Toronto.....	Michipicooten Dist.
*Mackey Point Gold Mines, Ltd.....	Suite 412, 266 St. James St., Montreal, P.Q.....	Little Long Lac Dist.
*MacLeod-Cockshutt Gold Mines, Ltd.....	357 Bay St., Toronto.....	Little Long Lac Dist.
*Magnet Consolidated Mines.....	347 Bay St., Toronto.....	Terragami.
*Manitoba & Eastern Mines, Ltd.....	709 Excelsior Life Bldg., Toronto.....	Little Long Lac Dist.
Marquette Long Lac Gold Mines, Ltd.....	200 Bay St., Toronto.....	Matachewan Dist.
Matachewan Consolidated Mines, Ltd.....	25 King St. W., Toronto.....	Patricia Dist.
*Mattson Patricia Mining Co., Ltd.....	400 Montreal Trust Bldg., Winnipeg, Man.....	Kenora Dist.
*May-Spiers Gold Mines, Ltd.....	36 Toronto St., Toronto.....	Patricia Dist.
*Madson Red Lake Gold Mines, Ltd.....	67 Yonge St., Toronto.....	Patricia Dist.
McKenzie Red Lake Gold Mines, Ltd.....	705 National Bldg., Toronto.....	Sudbury Dist.
McMillan Gold Mines, Ltd.....	Room 104, Mackey Block, Sudbury.....	Bourkes.
*Mesabi Gold Mines, Ltd.....	1306 Star Bldg., Toronto.....	Melba Tp.
*Melba Gold Mines, Ltd.....	388 St. James St. W., Montreal, P.Q.....	Algoma Dist.
*Milnac Mines, Ltd.....	612 Queen St. E., Sault Ste. Marie.....	Michipicooten Dist.
Minto Gold Mines, Ltd.....	Arntfield, P.Q.....	Little Long Lac Dist.
*Mosher Long Lac Gold Mines, Ltd.....	Room 714, 320 Bay St., Toronto.....	Matheson.
*Munro Croesus Mines, Ltd.....	Haileybury.....	Algoma Dist.
*Murray-Algoma Mining Co., Ltd.....	18 Lansdowne Ave., Sault Ste. Marie.....	Little Long Lac Dist.
*Nordarm Longlac Mines, Ltd.....	Room 1311, 44 Victoria St., Toronto.....	Empire.
Northern Empire Mines, Co., Ltd.....	Empire.....	Gauthier Tp.
*Northrand Syndicate, Ltd.....	34 Duncan Ave., Kirkland Lake.....	Houck Tp.
*Oeto Long Lac Gold Mines, Ltd.....	Sturgeon Falls.....	Fort Frances Dist.
Olive Gold Mine.....	1706 Sterling Tower, Toronto.....	Sachigo River.
*Ontago Gold Mines, Ltd.....	25 King St. W., Toronto.....	Fort Frances Dist.
*Orelia Mines, Ltd.....	Room 1, 269 College St., Toronto.....	Jellicoe.
*Oremond Gold Mines, Ltd.....	347 Bay St., Toronto.....	Michipicooten Dist.
Parkhill Gold Mines, Ltd.....	Room 98, 388 St. James St. W., Montreal, P.Q.....	Red Lake Dist.
*Paulore Gold Mines, Ltd.....	357 Bay St., Toronto.....	Jellicoe.
*Pelican Long Lac Gold Mines, Ltd.....	203 Royal Bank Bldg., Toronto.....	Earnsey Tp.
*Pecairium Gold Mines, Ltd.....	80 Richmond St. W., Toronto.....	Patricia Dist.
Pickle Crow Gold Mines, Ltd.....	Pickle Crow.....	

DIRECTORY OF FIRMS—Continued

Name	Head office address	Location
Principal Operators (x) in Canadian Auriferous Quartz Mining Industry, 1937—Continued		
ONTARIO—Others—Concluded		
*Pickwick Gold Mines	304 Bay St., Toronto	Patricia Dist.
*Portage Long Lac Gold Mines	506 Federal Bldg., Toronto	Little Long Lac area.
*Prospectors Airways Co., Ltd.	80 King St. W., Toronto	Various.
*Rajah Red Lake Gold Mines	710 Excelsior Life Bldg., Toronto	Red Lake.
*Red Crest Gold Mines, Ltd.	1178 Phillips Place, Montreal, P.Q.	Red Lake Dist.
*Red Lake Gold Shore Mines, Ltd.	350 Bay St., Toronto	Red Lake Dist.
*Redwood Gold Mines, Ltd.	Suite 1007, 80 Richmond St. W., Toronto	Red Lake Dist.
*Richgreen Gold Mines, Ltd.	36 Toronto St., Toronto	Sturgeon River area.
*Richmac Gold Mines, Ltd.	Room 1502, 372 Bay St., Toronto	Red Lake.
*Rickard Ramore Gold Mines, Ltd.	601 Concourse Bldg., Toronto	Richard Tp.
*Roeanor Gold Mines, Ltd.	700 Bank of Commerce Bldg., Hamilton	Patricia Lake.
*Roger Red Lake Gold Mines, Ltd.	302 Sterling Tower, Toronto	Red Lake.
*Rouge D'Or Mines, Ltd.	244 Bay St., Toronto	Red Lake.
*Rowan Red Lake Gold Mines, Ltd.	507 Place d'Armes, Montreal, P.Q.	Red Lake Dist.
*Sachigo River Exploration Co., Ltd.	Suite 2600, 25 King St. W., Toronto	Sachigo River.
*St. Anthony Gold Mines, Ltd.	159 Bay St., Toronto	Sturgeon Lake Dist.
*Sand River Gold Mining Co., Ltd.	302 Bay St., Toronto	Thunder Bay Dist.
*Sanshaw Mines, Ltd.	Suite 603, 330 Bay St., Toronto	Red Lake Dist.
*Savant Sturgeon Gold Mines, Ltd.	314 Metropolitan Bldg., Toronto	Sturgeon Lake Dist.
*Schreiber Pyramid Gold Mines, Ltd.	372 Bay St., Toronto	Thunder Bay Dist.
*Skookum Gold Mines, Ltd.	244 Bay St., Toronto	Red Lake Dist.
*Spirit Lake Gold Mines, Ltd.	Room 704, 357 Bay St., Toronto	Patricia Dist.
*Split Lake Gold Mines, Ltd.	1104, 67 Yonge St., Toronto	Kenora Dist.
*Spoonor Gold Mines, Ltd.	67 Yonge St., Toronto	Beardmore Dist.
*Strathy Basin Mines, Ltd.	712 Federal Bldg., Toronto	Strathy Tp.
*Straw Lake Beach Gold Mines, Ltd.	710 Excelsior Life Bldg., Toronto	Kenora Dist.
*Sturgeon River Gold Mines, Ltd.	Jellicoe	Thunder Bay Dist.
*Sudlac Gold Mines, Ltd.	717 Federal Bldg., Toronto	Little Long Lac and Sudbury Dists.
*Supreme Gold Mines, Ltd.	314 Metropolitan Bldg., Toronto	Thunder Bay Dist.
*Surprise Lake Exploration Syndicate, Ltd.	701 National Bldg., Toronto	Patricia Dist.
*Tashota Goldfields, Ltd.	Tashota	Tashota.
*Tellaurum Gold Mines, Ltd.	New Liskeard	Little Long Lac area.
*Tomhill Gold Mines, Ltd.	Empire	Little Long Lac area.
*Toronto Harker Mines, Ltd.	67 Yonge St., Toronto	Harker Tp.
*Traverse Long Lac	85 Richmond St. W., Toronto	Little Long Lac area.
*Treasure Island Gold Mines, Ltd.	80 Richmond St. W., Toronto	Abitibi Lake Dist.
*Tyrant Mines, Ltd.	Box 670, Kirkland Lake	Temiskaming Dist.
*Uchi Gold Mines, Ltd.	25 King St. W., Toronto	Patricia Dist.
*Upper Seine Gold Mines, Ltd.	702 Kent Bldg., Toronto	Atikokan.
*Valloc Gold Mines, Ltd.	80 Richmond St. W., Toronto	Kenora Dist.
*Wascanna Mines, Ltd.	67 Yonge St., Toronto	Kowkash M.D.
*Wendigo Gold Mines, Ltd.	1306 Star Building, Toronto	Kenora Dist.
*West-Side Long Lac Mines, Ltd.	Room 1701, 372 Bay St., Toronto	Little Long Lac Dist.
*Wilson Red Lake Gold Mines, Ltd.	1116 Federal Bldg., Toronto	Patricia Dist.
*Woco Gold Developments, Ltd.	1208 Victoria Bldg., Toronto	Patricia Dist.
*Ypres Cadillac Mines, Ltd.	Suite 45, 171 Yonge St., Toronto	Baden Tp.
MANITOBA—		
*Bergold Development Co., Ltd.	225 Curry Bldg., Winnipeg	The Pas M.D.
*Bobjo Mines, Ltd.	302 Bay St., Toronto, Ont.	Various.
*Conley Mines, Ltd.	505 Union Trust Bldg., Winnipeg	Rice Lake M.D.
*Consolidated Diana Gold Mines, Ltd.	749 Somerset Bldg., Winnipeg	Beresford Lake, Dist.
*Central Manitoba Mines, Ltd.	274 Fort St., Winnipeg	Wadhope.
*God's Lake Gold Mines, Ltd.	395 Main St., Winnipeg	God's Lake Dist.
*Golden West Mines, Ltd.	705 Great West Permanent Bldg., Winnipeg	The Pas M.D.
*Gunnar Gold Mines, Ltd.	80 King St. W., Toronto, Ont.	Beresford Lake.
*Gurney Gold Mines, Ltd.	919 Grain Exchange Bldg., Winnipeg	The Pas M.D.
*Kelsey Gold Mines, Ltd.	919 Grain Exchange Bldg., Winnipeg	The Pas M.D.
*Laguna Gold Mines, Ltd.	Suite 602, 350 Bay St., Toronto, Ont.	Herb Lake Dist.
*Ophir Gold Mines, Ltd.	7/325 Main St., Winnipeg	Gem Lake Dist.
*Packsack Mines, Ltd.	306/295 Main St., Winnipeg	Rice Lake Dist.
*Pine Lake Gold Mines, Ltd.	445 Somerset Bldg., Winnipeg	Oxford Lake Dist.
*San Antonio Gold Mines, Ltd.	237 Curry Bldg., Winnipeg	Rice Lake Dist.
*Scotia Gold Mines, Ltd.	290 Garry St., Winnipeg	Beresford Lake area.
*Sunbeam Kirkland Gold Mines, Ltd.	347 Bay St., Toronto, Ont.	West Hawk Lake.
SASKATCHEWAN—		
*Athona Mines, Ltd.	1306 Star Bldg., Toronto, Ont.	Athabaska Lake.
*Consolidated Mining and Smelting Company of Canada, Limited	Trail, B.C.	Athabaska Lake.
*Flin Flon Gold Mines, Ltd.	310 Avenue Block, Winnipeg, Man.	Douglas Lake.
*Fondulac Mining Corporation, Ltd.	1306 Star Bldg., Toronto, Ont.	Athabaska Lake.
*Goldecrest Mines, Ltd.	1306 Star Bldg., Toronto, Ont.	Athabaska Lake.
*Graham, Robert	Box 426, The Pas	The Pas Dist.
*Monarch Gold Miners Syndicate, Ltd.	705 Great West Permanent Bldg., Winnipeg, Man.	Beaver Lake Dist.
BRITISH COLUMBIA—		
*Abco Mines, Ltd.	800 Hall Bldg., Vancouver	Vancouver Island.
*Amandy Mine	Gravel Forks	Greenwood M.D.
*Anderson Group	Kimberley	Fort Steele M.D.
*Ashloo Gold Mines, Ltd.	602 Hastings St. W., Vancouver	Vancouver M.D.

DIRECTORY OF FIRMS—Continued

Name	Head office address	Location
Principal Operators (x) in Canadian Auriferous Quartz Mining Industry, 1937—Continued		
BRITISH COLUMBIA—Continued		
Bayonne Consolidated Mines.....	932 Marine Bldg., Vancouver.....	Nelson M.D.
Bernato Claim.....	Westbridge.....	Horseshoe Mountain.
*Bickley Bay Mining Co., Ltd.....	305/850 Hastings St. W., Vancouver.....	Nanaimo M.D.
Blackcock Mines, Ltd.....	212, 7th Avenue W., Calgary, Alberta.....	Nelson M.D.
Bralorne Mines, Ltd.....	555 Burrard St., Vancouver.....	Lillooet Dist.
*British Gold Mining Syndicate.....	7 Arcade Bldg., Victoria.....	Yale Dist.
*B. R. Mountain Golds, Ltd.....	800 Hall Bldg., Vancouver.....	Lillooet Dist.
Brown, H.....	Ymir.....	Ymir Dist.
*B. R. X. Consolidated Mines, Ltd.....	616 Stock Exchange Bldg., Vancouver.....	Bridge River.
*Burns Mountain Gold Quartz Mines, Ltd.....	Suite 5, 410 Seymour St., Vancouver.....	Cariboo M.D.
California Mine.....	Nelson.....	Nelson Dist.
*Canadian Exploration, Ltd.....	11th Floor, Royal Bank Bldg., Vancouver.....	(examinations).
Cariboo Gold Quartz Mining Co., Ltd.....	602 Bower Bldg., Vancouver.....	Wells.
*Cariboo Hudson Gold Mines, Ltd.....	1408 Royal Bank Bldg., Vancouver.....	Barkerville Dist.
*Cariboo Ledge Mining Co., Ltd.....	101 Royal Trust Bldg., Vancouver.....	Van Winkle.
*Cariboo Yankee Belle Mining Co., Ltd.....	510 W. Hastings St., Vancouver.....	Quesnel M.D.
Carmichael, R. H.....	Similkameen.....	Osoyoos M.D.
Cawley, C. A., & Associates.....	Salmo.....	Nelson M.D.
*Chico Explorations, Ltd.....	918 Rodgers Bldg., Vancouver.....	Tatlayoko Lake.
Clubine Comstock Gold Mines, Ltd.....	213 Medical Arts Bldg., Nelson.....	Nelson M.D.
*Consolidated Mining and Smelting Company of Canada, Limited.....	Trail.....	Yale, Stikine, Aiken Lake, Portland Canal.
Danzig Mines, Inc.....	310 Lloyd Bldg., Seattle, Wash., U.S.A.....	Nootke Sound.
Dentonina Mines, Ltd.....	808 Credit Foncier Bldg., Vancouver.....	Greenwood Dist.
Dufferin Gold, Ltd.....	514/510 W. Hastings St., Vancouver.....	Erie.
Fairview Amalgamated Gold Mines, Ltd.....	902/475 Howe St., Vancouver.....	Oliver.
*Fire Lake Syndicate.....	555 Howe St., Vancouver.....	Fire Mountain.
*Frost, A. C.....	Henry Bldg., Seattle, Wash., U.S.A.....	Nelson M.D.
*Gem Gold Mines, Ltd.....	955 Thurlow St., Vancouver.....	Nanaimo M.D.
General Lee Mining & Milling Co.....	700 Insurance Bldg., Seattle, Wash., U.S.A.....	Nelson M.D.
Godfrey Birch (Leaser).....	Erie.....	Erie.
*Gold Belt Mining Co., Ltd.....	616 Stock Exchange Bldg., Vancouver.....	Nelson M.D.
*Gold Cup Mining Co., Ltd.....	Room 1430, 165 Broadway, New York City, U.S.A.....	Trail Creek M.D.
Gold Mountain Mines, Ltd.....	703 Royal Trust Bldg., Vancouver.....	Hedley.
*Gold Peak Gold Mines, Ltd.....	82/475 Howe St., Vancouver.....	Lillooet M.D.
*Gold Recoveries (Cariboo), Ltd.....	817 Granville St., Vancouver.....	Cariboo M.D.
Golden Leasers, Ltd.....	705/850 Hastings St., Vancouver.....	Portland Canal.
*Golden Zone Mines, Ltd.....	514/510 Hastings St. W., Vancouver.....	Hedley.
*Grange Consolidated Mines, Ltd.....	524 Vancouver Bldg., Vancouver.....	Clinton M.D.
Greenbridge Gold Mines, Ltd.....	700 Lancaster Bldg., Calgary, Alberta.....	Greenwood M.D.
Greenwood Gold Mines, Ltd.....	510 West Hastings St., Vancouver.....	Greenwood M.D.
*Hedley Amalgamated Gold Mines, Ltd.....	404 West Hastings St., Vancouver.....	Hedley.
*Hedley Gold Lode Mines, Ltd.....	12/460 West Hastings St., Vancouver.....	Hedley.
Hedley Mascot Gold Mines, Ltd.....	1132 Marlene Bldg., Vancouver.....	Osoyoos M.D.
*Hedley Peak Gold Mines, Ltd.....	12/640 West Hastings St., Vancouver.....	Hedley.
*Hidden Creek Gold Mines, Ltd.....	1229 Standard Bank Bldg., Vancouver.....	Yale M.D.
*Highland Surprise Gold Mines, Ltd.....	850 West Hastings St., Vancouver.....	Ainsworth M.D.
Home Gold Mining Co., Ltd.....	1044 Melville St., Vancouver.....	Yale M.D.
Island Mountain Mines, Co., Ltd.....	Wells.....	Cariboo M.D.
I. X. L. Lessors, Ltd.....	Rossland.....	Trail Creek M.D.
*Johannesburgh Gold Mining Co., Ltd.....	800 Hall Building, Vancouver.....	Nicola M.D.
Kalamalka Gold Mines, Ltd.....	Box 98, Vernon.....	Lavington.
Kelowna Exploration Co., Ltd.....	Hedley.....	Osoyoos M.D.
*Kimberley Goldfields Co., Ltd.....	Hanson Block, Cranbrook.....	Fort Steele M.D.
*King Midas Mining Co., Ltd.....	509 Vancouver Block, Vancouver.....	Zeballos River.
Krpan, P., and Radosevich, J.....	Rossland.....	Rossland.
Kootenay Belle Gold Mines, Ltd.....	18/425 Howe St., Vancouver.....	Nelson M.D.
Kootenay Ore Hill Gold Mines, Ltd.....	850 West Hastings St., Vancouver.....	Nelson M.D.
Lins, B. A.....	Rossland.....	Rossland.
Livesley, J. H.....	Ahusat.....	Clayoquot M.D.
Livingstone Mining Co., Ltd.....	Blowatt.....	Blowatt.
Lone Silver Gold Mines, Ltd.....	819 Vancouver Block, Vancouver.....	Salmo.
*Louise Mining Co., Ltd.....	725 Pacific Bldg., Vancouver.....	Lillooet M.D.
*Lucky Strike Gold Mining Co., Ltd.....	811 Credit Foncier Bldg., Vancouver.....	Lytton.
*Lytton Gold Mines, Ltd.....	1110 E. 15th Avenue, Vancouver.....	Grand Forks M.D.
McArthur, W. E. (4 mines).....	Box 629, Greenwood.....	Nelson M.D.
McKenna, R. I. (Lease).....	Nelson.....	Bridge River Dist.
Minto Gold Mines, Ltd.....	Minto Mine, P.O. Trail.....	Nelson M.D.
Mighton, F. A. (Bear Mine) (Partner).....	1814, 3rd Avenue, Trail.....	Lillooet M.D.
*Mix Gold Mines, Ltd.....	412 Hall Bldg., Vancouver.....	Grand Forks M.D.
*Molly Gibson Mines, Ltd.....	412 Grain Exchange Bldg., Calgary, Alberta.....	Bridge River area.
*National Gold Mines, Ltd.....	502 Pacific Bldg., Vancouver.....	Nelson.
Noble Five Mines, Ltd.....	490 Baker St., Nelson.....	Rossland Dist.
*O. K. Leasing Co.....	Box 522, Rossland.....	Erie.
Oscarson, R. O.....	Erie.....	Osoyoos M.D.
Osoyoos Mines, Ltd.....	Bank of Toronto Bldg., Calgary, Alberta.....	Lillooet M.D.
*Pacific Bonanza Gold Mines, Ltd.....	802/475 Howe St., Vancouver.....	Bridge River, Dist.
*Pacific Eastern Gold, Ltd.....	742 West Hastings St., Vancouver.....	Grand Forks.
*Pathfinder Consolidated Mining Co.....	Bridge St., Grand Forks.....	Bridge River Dist.
*Pilot Gold Mines, Ltd.....	Suite 5, 410 Seymour St., Vancouver.....	Lillooet Dist.
Pioneers Gold Mines of B. C., Ltd.....	605 Rogers Bldg., Vancouver.....	Nelson M.D.
Poolzer, Alex.....	Nelson.....	Atlin M.D.
*Polaris-Taku Mining Co., Ltd.....	807 Lonsdale Bldg., Duluth, Minn., U.S.A.....	

DIRECTORY OF FIRMS—Continued

Name	Head office address	Location
Principal Operators (x) in Canadian Auriferous Quartz Mining Industry, 1937—Concluded		
BRITISH COLUMBIA—Concluded		
Privateer Mines, Ltd.	604 Bank of Toronto Bldg., Victoria.	Zeballos River Dist.
Relief Arlington Mines, Ltd.	Premier.	Nelson M.D.
Reno Gold Mines, Ltd.	216 Yorkshire Bldg., Vancouver.	Nelson M.D.
Reward Mining Co., Ltd.	919 Stock Exchange Bldg., Vancouver.	Porcher Island
Riegal Mines, Ltd.	Grand Forks.	Grand Forks, Greenwood M.D.
Rolick, Peter.	Nelson.	Nelson M.D.
*Russell Ventures Mining Co.	570 Granville St., Vancouver.	Lillooet M.D.
*Santiago Mines, Ltd.	1203 Matthews Ave., Vancouver.	Jervis Inlet.
Sheep Creek Gold Mines, Ltd.	616 Stock Exchange Bldg., Vancouver.	Nelson M.D.
*Shoal Bay Gold Mining Syndicate.	305/850 Hastings St. W., Vancouver.	Nanaimo M.D.
Silbak Premier Mines, Ltd.	Royal Trust Bldg., Vancouver.	Portland Canal M.D.
*Spud Valley Gold Mines, Ltd.	608 Pacific Bldg., Vancouver.	Zeballos River Dist.
Streider, J., and Klinsky, J.	Greenwood.	Greenwood M.D.
Surf Inlet Consolidated Gold Mines, Ltd.	744 W. Hastings St., Vancouver.	Skeena M.D.
*Taylor Windfall Gold Mining Co., Ltd.	612/789 West Pender St., Vancouver.	Clinton M.D.
*Thunderbird Mines, Ltd.	Bank of Commerce Bldg., Nelson.	Invermere.
*Trimble Mines, Ltd.	304 Stock Exchange Bldg., Vancouver.	Lillooet M.D.
Velvet Gold Mining Co.	1500 Royal Bank Bldg., Vancouver.	Kootenay Dist.
Velvet Gold Copper Mines, Inc.		Nelson M.D.
Venus June Mine (lease)	406 First St., Nelson.	Clinton M.D.
Vidette Gold Mines, Ltd.	404 Pacific Bldg., Vancouver.	Pend d'oreille River.
*Waneta Gold Mines, Ltd.	Box 149, Nelson.	Lillooet Div.
Wayside Consolidated Gold Mines, Ltd.	555 Howe St., Vancouver.	Portland Canal Dist.
Welland Mining, Milling & Power Co., Ltd.	Stewart.	Cariboo Dist.
Windle, Jos.	Barkerville.	Ymir.
Wesko Mines, Ltd.	Bank of Montreal Bldg., Vancouver.	Ymir.
Wilcox Mining Syndicate.	Ymir.	Kamloops M.D.
Windpass Gold Mining Co., Ltd.	608 Pacific Bldg., Vancouver.	Nelson M.D.
Ymir Yankee Girl Gold Mines, Ltd.	525 Seymour St., Vancouver.	Nelson M.D.
Ymir Consolidated Gold Mines, Ltd.	704 Royal Trust Bldg., Vancouver.	Nelson M.D.
Young, Wm.	3353 Garden Drive, Vancouver.	
*Zeballos Gold Peak Mines, Ltd.	421 Rogers Bldg., Vancouver.	Zeballos.
NORTHWEST TERRITORIES—		
*Camlaren Mines Dist.	Suite 602, 350 Bay St., Toronto, Ont.	Gordon Lake Dist.
*Connell Mine & Exploration Co., Ltd.	85 Richmond St. W., Toronto, Ont.	Various.
*Consolidated Mining and Smelting Company of Canada, Limited.	Trail, B.C.	Yellowknife Dist.
*Giant Yellowknife Gold Mines, Ltd.	80 King St. W., Toronto, Ont.	Yellowknife Dist.
*Slave Lake Gold Mines, Ltd.	1306 Star Bldg., 80 King St. W., Toronto, Ont.	Great Slave Lake.
*Territories Exploration Co., Ltd.	Suite 602, 350 Bay St., Toronto, Ont.	Yellowknife Dist.
*Ventures, Ltd.	25 King St. W., Toronto, Ont.	Yellowknife River.
*Yellowknife Gold Mines, Ltd.	215/159 Bay St., Toronto, Ont.	

* Active but not producing.

NOTE.—In addition to the operators listed, there were numerous active properties (assessment work, etc.) for which official returns were not received.

Operators in Canadian Copper-Gold-Silver Mining Industry

QUÉBEC—		
Aldermac Copper Corporation, Ltd.	941 Dominion Square Bldg., Montreal.	Beauchastel Tp.
*Bagamac Mines, Ltd.	244 Bay St., Toronto, Ont.	Rouyn Tp.
*Big Four Mining Syndicate, Ltd.	464 St. François Xavier St., Montreal.	Rouyn, Duprat and Destor Tps.
*Carlson Copper Syndicate	Grills Block, New Liskeard, Ont.	Dufoy Tp.
Consolidated Copper and Sulphur Co.	Eustis.	Ascot Tp.
*Despina Gold Mines, Ltd.	c/o A. H. Tanner, 276 St. James St. W., Montreal, P.Q.	Duprat-Rouyn Tp.
*Fleury Chibougamau Exploration Syndicate.	65 St. Peter St., Quebec City.	Roy Tp.
*La Mine d'Or de la Baie Proulx de Chibougamau, Ltée.	Chambord Junction.	Chibougamau Dist.
*MacDonald Mines, Ltd.	132 St. James St. W., Montreal.	Dufrenoy Tp.
Noranda Mines, Ltd (2 mines).	1600 Royal Bank Bldg., Toronto, Ont.	Rouyn Tp.
Nornetal Mining Corporation, Ltd.	350 Bay St., Toronto, Ont.	Desmeloizes Tp.
*Obalski Mining Corporation	1024 Canada Cement Bldg., Montreal.	Chibougamau Dist.
*Opemiska Copper Mines, Ltd.	25 King St. W., Toronto.	Levy Tp.
*Poulin Mining Co., Ltd.	48 rue Fort, St. Lambert, Montreal.	Ascot Tp.
*Quebec Mining Properties Exchange Inc.	Amos.	Northwest Quebec.
*Rand Malartic Mines, Ltd.	418 Ottawa Electric Bldg., Ottawa, Ont.	Fournière Tp.
Syndicate Industrial.	500 Place d'Armes, Montreal.	Fabre Tp.
Waite-Amulet Mines, Ltd.	Noranda.	Duprat and Dufrenoy Tps.
ONTARIO—		
Pancake Bay Syndicate	612 Queen St. E., Sault Ste. Marie.	Ryan Tp.
MANITOWA—		
Hudson Bay Mining & Smelting Co., Ltd.	14 Finkle St., Woodstock, Ont.	Flin Flon.
Sherritt Gordon Mines, Ltd.	25 King St. W., Toronto.	Sherridon.

DIRECTORY OF FIRMS—Continued

Name	Head office address	Location
Operators in Canadian Copper-Gold-Silver Mining Industry—Concluded		
SASKATCHEWAN— Hudson Bay Mining & Smelting Co., Ltd.....	14 Finkle St., Woodstock, Ont.....	Flin Flon.†
BRITISH COLUMBIA (a)— *Amot, Alif.....	Vancouver.....	Kamloops.
Britannia Mining & Smelting Co., Ltd.....	Britannia Beach.....	Britannia Beach.
*Consolidated Mining and Smelting Company of Canada, Limited.....	Trail.....	Portland Canal and Ft. Steele M.D. Kamloops M.D.
Copper King Mine (McKelvie Bros.).....	Kamloops.....	
Granby Consolidated Mining, Smelting and Power Co., Ltd.....	675 Hastings St. W., Vancouver.....	Copper Mountain.
*Nicholson Creek Corp.....	Usk.....	Omineca M.D.
*Tyee Consolidated Mining Co., Ltd.....	616 Stock Exchange Bldg., Vancouver.....	Victoria M.D.

(*) Active but not producing.

(†) This property is divided by Manitoba-Saskatchewan boundary.

(a) In addition to the companies listed, there were numerous operators working under lease on other mines in the Ross-land district (salvage operations).

Beryl

*Canadian Beryllium Mines & Alloys, Ltd....	901 Royal Bank Bldg., Toronto, Ont.....	Quadeville, Ont.
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* Active but not producing.

Chrome Ore Mining Industry

QUEBEC— Asbestos Corporation, Ltd.....	Canada Cement Bldg., Montreal.....	Thetford Mines.
Product—Chromite.		
ONTARIO— Chromium Mining & Smelting Corp., Ltd.....	Bank of Commerce Bldg., Hamilton.....	Collins.
Product—Chromite and ferrochrome.		

Manganese Ore Mining Industry

NOVA SCOTIA— Atlantic Manganese Corp., Ltd. (*).....	Bank of Nova Scotia Bldg., Truro, N.S.....	New Ross.
NEW BRUNSWICK— Harrison, E.....	Forrest Hill, N.B.....	Elgin.
Manganese, Ltd.....	Elgin, N.B.....	Elgin.

* Active but not producing.

Molybdenite Mining Industry

QUEBEC— Bain, J. Estate*.....	c/o Toronto General Trust Corp., Ottawa, Ontario.	Hull Co.
Kindale Mines, Ltd.*.....	217 University Tower, Montreal.....	Masham Tp.
Molybdenite Corp., of Can., Ltd.*.....	445 François-Xavier St., Montreal.....	Abitibi Dist.
ONTARIO— Duke Molybdenite Synd.*.....	Mace, Ont.....	Mace.
Gratton, John B.*.....	Searchmont, Ont.....	Gaudette Tp.
McCoy Molybdenite, Ltd.*.....	217 Bay St., Toronto, Ont.....	Renfrew Co.
Zenith Molybdenite Corp., Ltd.....	85 Richmond St. W., Toronto, Ont.....	Renfrew Co.
BRITISH COLUMBIA— Consolidated Mining & Smelting Company of Canada, Ltd.*.....	Trail.....	Clinton.

* Active but not producing.

DIRECTORY OF FIRMS—Continued

Name	Head office address	Location
THE NICKEL-COPPER MINING INDUSTRY IN CANADA		
NEW BRUNSWICK— *Maruba Corporation, Ltd.....	1111 Aldred Bldg., Montreal, Que.....	St. Stephen.
ONTARIO— *Anglo-Sudbury Nickel Corp., Ltd..... *Denison Nickel Mines, Ltd..... *Drury Nickel Mines, Ltd..... Falconbridge Nickel Mines, Ltd..... International Nickel Co. of Can., Ltd.....	706 Concourse Bldg., Toronto..... 607 Reford Bldg., 217 Bay St., Toronto..... 44 Victoria St., Toronto..... 25 King St. W., Toronto..... Copper Cliff.....	Sudbury and Algoma Dist. Worthington. Drury Twp. Falconbridge Twp. Mines in Twps. of Levack, Snider, McKim & Garson. Smelters at Copper Cliff and Coniston. Refinery at Port Colborne. Goward and Sudbury Dist.
*Ontario Nickel Corp., Ltd.....	38 King St. W., Toronto.....	
BRITISH COLUMBIA— B. C. Nickel Mines, Ltd..... *Western Nickel Corp., Ltd.....	Choate..... 2/425 Howe St., Vancouver.....	Yale M.D. Yale M.D.

* Active but not producing.

Non-Ferrous Smelting and Refining Industry

Copper Smelting Companies

Noranda Mines, Ltd.....	2 King St. E., Toronto, Ont.....	Noranda, Que.
†International Nickel Co., of Canada, Ltd.....	67 Wall St., New York City, U.S.A.....	Copper Cliff, Coniston and Port Colborne, Ont.
†Falconbridge Nickel Mines, Ltd.....	25 King St. W., Toronto, Ont.....	Falconbridge, Ont.
Hudson Bay Mining & Smelting Co., Ltd.....	14 Finkle St., Woodstock, Ont.....	Flin Flon, Man.

† Smelt nickel-copper ores and produce platinum and other precious metals.

Electrolytic Copper Refining Companies

Canadian Copper Refiners, Ltd. (c).....	2 King St. E., Toronto, Ont.....	Montreal East, Que.
Ontario Refining Co., Ltd. (c).....	Cooper Cliff, Ont.....	Copper Cliff, Ont.

(c) Also produce refined gold, silver, tellurium and selenium.

Lead Smelting and Refining Company

Consolidated Mining and Smelting Company of Canada, Ltd. (*).....	215 St. James St. W., Montreal, Que.....	Trail, B.C.
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(*) Produce bismuth or bismuth-bearing bullion as by-products, also gold and silver.

Electrolytic Zinc Refining Companies

Consolidated Mining and Smelting Company of Canada, Ltd. (*).....	215 St. James St. W., Montreal, Que.....	Trail, B.C.
Hudson Bay Mining and Smelting Co., Ltd. (*)	14 Finkle St., Woodstock, Ont.....	Flin Flon, Man.

(*) Also produce cadmium.

Smelter and Refiner of Cobalt-Silver-Arsenic Ores

Deloro Smelting and Refining Co., Ltd. (*)....	Deloro, Ont.....	Deloro, Ont.
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(*) Produce bismuth-bearing bullion, silver, cobalt and cobalt and nickel salts.

Refiner of Uranium-Radium Ores

Eldorado Gold Mines, Ltd.....	Star Bldg., Toronto, Ont.....	Port Hope, Ont.
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DIRECTORY OF FIRMS—Continued

Name	Head office address	Location
Producer of Primary Aluminium		
Aluminum Company of Canada, Ltd.....	Canada Life Bldg., Toronto (2), Ont.....	Arvida and Shawinigan Falls Que.
Antimony Ore		
NOVA SCOTIA— Berggren Chester.....	R.R.2. Bedford, N.S.....	West Gore.
Smelter of Chromium Ores		
Chromium Mining and Smelting Corp.....	Bank of Commerce Bldg., Hamilton, Ont...	Sault Ste. Marie, Ont.
Iron Ores		
ONTARIO— Algoma Ore Properties, Ltd.(*)..... Steerola Exploration Co. (*).....	Sault Ste. Marie, Ont..... 25 King St. W., Toronto, Ont.....	Algoma Dist. Atikokan.
(*) Active but not producing.		
Producers of Platinum Metals(*)		
Cuniptau Mines, Ltd..... International Nickel Co. of Canada, Ltd..... Falconbridge Nickel Mines, Ltd.....	38 King St. W., Toronto..... Copper Cliff, Ont..... 25 King St. W., Toronto, Ont.....	Strathy Tp., Ont. Acton, England. Kristiansand, Norway.
(*) In addition to the companies listed, there are usually individual miners reporting the recovery of small quantities of alluvial platinum from streams in British Columbia.		
Quicksilver Ore		
Manitou Mining Co., Ltd.(*).....	789 West Pender St., Vancouver.....	Bridge River Dist., B.C.
(*) Active but not producing.		
Silver-Cobalt Mining Industry		
Cain, P. E..... Cane Silver Mines, Ltd..... Cobalt Properties, Ltd..... Comet Leasing Co..... Dean, J. C..... La Rose Rouyn Mines..... Martin, Geo..... McCready, W. E..... Miller, H. G..... Morgenthaler, A. G..... Mulholland, Thos..... Murphy & Landry..... Nipissing Mining Co., Ltd..... O'Brien, M. J., Ltd..... Plouffe, J. H..... Price, C. W..... Price, J. H..... Robitaille, J..... Rowe, A. & Stuckey, C..... Russell, Presse & McCready..... Shepherd, Wm. M..... Sirola, D..... Temiskaming Mining Co., Ltd..... Taylor, W. D..... *Windsor-Cobalt Silvers, Ltd..... Yorke-Bousquet Gold Mines, Ltd.....	37 Lang St., Cobalt, Ont..... Box 700, New Liskeard, Ont..... Galena St., Cobalt, Ont..... Box 274, Cobalt, Ont..... Cobalt, Ont..... 112 Yonge St., Toronto, Ont..... Box 659, Cobalt, Ont..... Box 130, Cobalt, Ont..... Silver Centre, Ont..... 2108 S. Second St., Philadelphia, Pa., U.S.A. Box 226, Cobalt, Ont..... Box 111, Cobalt, Ont..... Cobalt, Ont..... Box 939, Cobalt, Ont..... Cobalt, Ont..... Box 388, Cobalt, Ont..... Cobalt, Ont..... Cobalt, Ont..... Box 79, Cobalt, Ont..... Box 130, Cobalt, Ont..... Cobalt, Ont..... Cobalt, Ont..... 15 King St. W., Toronto, Ont..... Box 632, Cobalt, Ont..... 1 Toronto St., Toronto, Ont..... 276 St. James St., Montreal, P.Q.....	Lorraine Tp. Cane Tp. Cobalt. Kerr Lake. Cobalt. Cobalt. Giroux Lake. Cobalt. Silver Centre. Cobalt. Cobalt. Cobalt. Cobalt. Cobalt and Gowganda. Cobalt. Cobalt. Kerr Lake. Cobalt. South Lorraine. Bucke Tp. Cobalt. Cobalt. Cobalt. Cobalt. Cobalt.

(a) All located in Ontario.

(*) Active but no shipments made.

DIRECTORY OF FIRMS—Continued

Name	Head office address	Location
Silver-Lead-Zinc Mining Industry		
NOVA SCOTIA—		
British Metal Corp. (Canada), Ltd.	706 Dominion Square Bldg., Montreal, P.Q...	Stirling.
QUEBEC—		
*Calumet Mines, Ltd.	360 St. James St. W., Montreal	Calumet Island.
*Gunter Galena Mines, Ltd.	55 Scott St., Quebec	Frontenac Co.
Tétrault, Pierre, Estate of.	70 Holyrood Ave., Outremont, Montreal....	Montauban les Mines.
ONTARIO—		
*Fort Rouille Mining Corp., Ltd.	67 Yonge St., Toronto	Galetta.
Gunter Galena Mines, Ltd.	601/80 Richmond St. W., Toronto	Hastings Co.
Lake Geneva Mining Co., Ltd.	941 Dominion Square Bldg., Montreal, P.Q...	Sudbury Dist.
*Lennox Mines Co., Ltd.	John St., Napanee	Sheffield Tp.
BRITISH COLUMBIA—		
Adams, Chas.	Rossland	Rossland.
Ainsworth Mines, Ltd.	Box 680, Preston, Ont.	Ainsworth M.D.
Alco Silver Mining Co., Ltd.	708 Yorkshire Bldg., Vancouver	Revelstoke.
Baker, Jens.	Smithers	Babine Mts.
*Banta, Loveless & Campbell.	Smithers	Smithers.
*Base Metals Mining Corp., Ltd.	602/350 Bay St., Toronto, Ont.	Field.
Beaverdell Wellington Syndicate, Ltd.	Greenwood	Beaverdell.
Beaver Silver Leasers.	Beaverdell	Beaverdell.
Beaver Silver Mines, Ltd.	708 Yorkshire Bldg., Vancouver	Greenwood Area.
Beber, Joseph.	New Denver	New Denver.
Brown & Levis.	20 Marlborough Apts., Calgary, Alberta....	North Rossland.
Cameron, Arthur.	Box 52, Stewart	Stewart.
*Cheyne, Robert.	Kelowna	Greenwood.
Consolidated Mining & Smelting Co. of Canada, Limited.	Trail	Kimberley.
Consolidated Nicola Goldfields, Ltd.	406 Bank of Nova Scotia Bldg., Vancouver ..	Nicola.
Consolidated Queen Bess Mines, Ltd.	Alamo	Sandon and Alamo.
Cork-Province Mines, Ltd.	Kaslo	Ainsworth M.D.
Cunningham Mines, Ltd.	Alamo	Sandon.
Denver Mining Syndicate.	New Denver	Three Forks.
Deschamps, Samuel.	Stewart	Portland Canal M.D.
Doney, Ernest, & Sons.	Box 17, Sandon	Slocan M.D.
Durango Mines, Ltd.	308 Credit Foncier Bldg., Vancouver....	Nelson.
Eklund, Karl.	Box 148, Anyox	Portland Canal M.D.
Esperanza Mines, Ltd.	618 Broughton St., Victoria	Alice Arm.
Falconer, T. W.	Alice Arm	Alice Arm.
Fowler, Willard E.	Beaverdell	Beaverdell.
Galena Farm Consolidated Mines, Ltd.	616 Stock Exchange Bldg., Vancouver	Silverton.
Harris, J. M. & Kelly, F. T.	Sandon	Slocan M.D.
Highland Bell, Ltd.	Box 640, Penticton	Beaverdell.
*Highland Surprise Gold Mines, Ltd.	350 West Hastings St., Vancouver	Ainsworth M.D.
Jackson Mines, Ltd.	616 Stock Exchange Bldg., Vancouver	Slocan.
*Johnson, August.	Dorreen	Lorne Creek.
Krao Mines, Ltd.	Kaslo	Ainsworth M.D.
Laib, R. M.	Bayonne	Nelson M.D.
Lakeview Mining Syndicate.	Slocan City.	Slocan City.
Lakeview Mine.	Creston	Sanca.
Little, Geo. and Clore, A.	Terrace	Copper River.
Lucky Jim Lead & Zinc Co., Ltd.	616/475 Howe St., Vancouver	Zincton.
Margoli, S.	Sandon	Kaslo M.D.
Mathews, E.	Silverton	Red Mountain.
*MacCulloch, A. S.	555 Howe St., Vancouver	Albert Canyon.
McCreedy, Geo. E.	Retallack	West Kootenay.
Meridian Mining Co., Ltd. (a)	555 Howe St., Vancouver	Camborne.
*Michael Silver Lead Mines, Ltd.	1412 Bay Ave, Trail	Salmon River.
McPhee, J. (Monitor)	New Denver	Slocan M.D.
Munro, P. W. (Morning Star)	Slocan City.	Slocan City.
New True Pissure Mining & Milling Co., Ltd.	804 Guaranty Trust Bldg., Windsor, Ont.	Perguson.
Nicola Mines & Metals, Ltd. (b)	417 Metropolitan Bldg., Vancouver	Nicola.
Noble Five Mines, Ltd.	490 Baker St., Nelson	Sandon.
Nordman, J. L.	Beaverdell	Beaverdell.
O'Neal, D. B.	Slocan City.	Slocan City M.D.
Ottawa Silver Mining & Milling Co.	401 Sherwood Bldg., Spokane, Wash., U.S.A.	Slocan City M.D.
Pendry, J. H. (Rio)	New Denver	Sandon M.D.
*Reeves MacDonald Mines, Ltd.	616/475 Howe St., Vancouver	Salmo.
*Riogel Minos, Ltd.	Box 207, Grand Forks	Greenwood.
Ross Mining Syndicate, Ltd.	Nelson	Ainsworth M.D.
*Rufus Argenta Mines, Ltd.	211 Pemberton Bldg., Victoria	Portland Canal Dist.
Ruth-Hope Mining Co., Ltd.	475 Howe St., Vancouver	Sandon.
*St. Eugene Extension Mines, Ltd.	67 Yonge St., Toronto, Ont.	Moyie.
Sally Mines, Ltd.	Box 1122, Penticton	Beaverdell.
*Salmo-Malartic Mines, Ltd.	608/159 Bay St., Toronto, Ont.	West Kootenay.
Supples, R.	Salmo	Salmo.
Sherraden, R. (Eden-Crescent)	Ainsworth	Ainsworth.
Sherdall, C.	Westbridge	Yale Dist.
Singel, H. E. (Eureka)	Kaslo	Ainsworth M.D.

DIRECTORY OF FIRMS—Continued

Name	Head office address	Location
Silver-Lead-Zinc Mining Industry—Concluded		
BRITISH COLUMBIA—Concluded		
Silver Cup Mining & Milling Co., Ltd.....	Ferguson.....	Ferguson.
*Silver Ridge Mining Co., Ltd.....	Sandon.....	Sandon.
Slocan Idaho Mines Corp.....	509 Hutton Bldg., Spokane, Wash, U.S.A.....	Slocan Div.
Slocan Monitor Mines, Ltd.....	640 W. Pender St., Vancouver.....	Three Forks.
Sovereign Leassors.....	New Denver.....	Sandon.
Stinson, Bertram P.....	Box 362, Rossland.....	West Kootenay.
*Utica Mines, Ltd.....	551 Howe St., Vancouver.....	Ainsworth M.D.
Western Exploration Co., Ltd.....	Silverton.....	Silverton.
Whitewater Mines, Ltd.....	475 Howe St., Vancouver.....	Ainsworth M.D.
YUKON—		
Brefalt & Gustafson.....	Mayo.....	Mayo Dist.
Settlemier & Bermingham.....	Keno.....	Keno.
Sugiyami, J.....	Mayo.....	Galena Hill.
Treadwell Yukon Co., Ltd.....	920 Crocker Bldg., San Francisco, Calif., U.S.A.....	Galena Hill, Keno Hill.
Williamson, W. H.....	Mayo.....	Mayo Dist.
NORTHWEST TERRITORIES—		
Bear Exploration and Radium, Ltd. (c).....	215/159 Bay St., Toronto, Ont.....	Great Bear Lake Dist.
*Consolidated Mining & Smelting Co. of Canada, Ltd. (c).....	Trail, B.C.....	Great Bear Lake Dist.
Eldorado Gold Mines, Ltd. (c).....	80 King St. W., Toronto, Ont.....	Radium City.

(x) Active but not producing.

(a) Dismantling operations.

(b) Acquired by Consolidated Nicola Goldfields, Ltd.

(c) Mine silver or silver-pitchblende ores.

NOTE.—In addition to the operators shown for British Columbia, there were numerous properties worked under lease from which official reports were unobtainable.

Tellurium and Selenium (See copper refiners)**Titanium Ore Mining Companies**

QUEBEC—		
Baie St. Paul Titanic Iron Ore Co.....	Baie St. Paul.....	St. Urbain.
*Titanium Products Co.....	874 Sherbrooke St. E., Montreal.....	Chicoutimi Co.

* Active but not producing.

Tungsten Mining Industry

*NOVA SCOTIA—		
*Indian Path Tungsten Mines, Ltd.....	711 Dennis Bldg., Halifax, N.S.....	Lunenburg Co., N.S.
Product—Tungsten Ore.		
BRITISH COLUMBIA—		
*Columbia Tungsten Co., Ltd.....	61 Broadway, New York, N.Y., U.S.A.....	Wells area—Dist. 2.

* Active but not producing.

NON-METAL MINING INDUSTRIES, INCLUDING FUELS

FUELS

DIRECTORY OF FIRMS—Continued

Coal Mining Industry

Name	Head office address	Location
NOVA SCOTIA—		
		District
Acadia Coal Co., Ltd.	Stellarton	Pictou.
Bras d'Or Coal Co., Ltd.	Little Bras d'Or Bridge	Cape Breton.
British Coal Co., Ltd.	Sydney	Cape Breton.
Cumberland Railway & Coal Co., Ltd.	Springhill	Cumberland.
Dominion Coal Co., Ltd.	Sydney	Cape Breton.
Greenwood Coal Co., Ltd.	New Glasgow	Pictou.
Indian Cove Coal Co., Ltd.	Sydney Mines	Cape Breton.
Intercolonial Coal Co., Ltd.	Westville	Pictou.
Inverness Coal Mine	Inverness	Inverness.
Maritime Coal, Railway & Power Co., Ltd.	Amherst	Cumberland.
Nova Scotia Steel & Coal Co., Ltd.	Sydney	Cape Breton.
Port Hood Coal Mines, Ltd.	Port Hood	Inverness.
Shore Coal Co., Ltd.	Amherst	Cumberland.
Standard Coal Co., Ltd.	River Hebert	Cumberland.
Victoria Coal Co., Ltd.	New Glasgow	Cumberland.
NEW BRUNSWICK—		
		County
Avon Coal Co., Ltd.	Saint John	Queens.
Evans, W. B.	Minto	Queens.
King, G. H.	Chipman	Queens.
Maritime Mining Syndicate	Chipman	Queens.
McDougal Bros.	Minto	Queens.
Minto Coal Co., Ltd.	Minto	Queens.
Miramichi Lumber Co., Ltd.	Minto	Queens.
Mitchell, Parker D.	West Saint John	Queens.
Myles, Geo. H. & Co.	Minto	Queens.
Newcastle Coal Co.	Minto	Queens.
Weldon, Harvey	Minto	Queens.
Weldon & Henderson, Ltd.	Minto	Queens.
SASKATCHEWAN—		
		Municipality
Alder, Wm.	Bienfait	Near Bienfait.
Banks, H.	Taylorlton	Near Pinto.
Baniulis Bros.	Roche Percée	Roche Percée.
Bienfait Mines, Ltd.	Bienfait	Near Bienfait.
Blue Flame Coal Mines, Ltd.	Leakville	Near Leakville.
Crescent Collieries, Ltd.	Bienfait	Near Bienfait.
Eastern Collieries of Bienfait, Ltd.	Estevan	Near Bienfait.
High test Lignite Coal Co., Ltd.	Bienfait	Near Bienfait.
Jenish Bros.	Estevan	Near Estevan.
Lignite Coal Mines, Ltd.	Pinto	Near Taylorlton.
Manitoba and Saskatchewan Coal Co., Ltd.	503 Avenue Bldg., Winnipeg, Man.	Near Bienfait (Taylorlton).
Matheson and Uhrich	Taylorlton	Taylorlton.
North West Coal Co.	Bienfait	Near Bienfait.
Poage, H. E.	Roche Percée	Roche Percée.
Rock Springs Coal Co.	Taylorlton	Near Estevan.
Shand Coal & Brick Co.	Shand	Shand.
Siddall and Mitchell	Roche Percée	Roche Percée.
Truxar Coal Co., Ltd.	Estevan	Near Estevan.
Western Dominion Collieries, Ltd.	Taylorlton	Taylorlton.
ALBERTA—		
		District
Bituminous—		
Brazeau Collieries, Ltd.	Nordegg	Nordegg.
Cadomin Coal Co., Ltd.	Cadomin (mine office), Edmonton (business office)	Mountain Park.
Canmore Coal Co., Ltd.	Canmore	Cascade.
Hillcrest Collieries, Ltd.	Hillcrest	Crowsnest.
International Coal & Coke Co., Ltd.	Coleman	Crowsnest.
K. D. Collieries, Ltd.	Luscar	Mountain Park.
Luscar Collieries, Ltd.	Edmonton	Mountain Park.
McGillivray Creek Coal & Coke Co., Ltd.	Coleman	Crowsnest.
Mohawk Bituminous Mines, Ltd.	Bellevue	Crowsnest.
Mountain Park Collieries, Ltd.	410 Tegler Bldg., Edmonton	Mountain Park.
West Canadian Collieries, Ltd.	Blairmore	Crowsnest.
Sub-bituminous—		
Alexo Coal Co., Ltd.	Alexo	Saunders.
Bighorn & Saunders Creek Collieries, Ltd.	Saunders	Saunders.
Bryan Coal Co., Ltd.	Edmonton	Coalspur.
Coal Valley Mining Co., Ltd.	Coal Valley	Coalspur.
Foothills Collieries, Ltd.	Foothills	Coalspur.
Hinton Collieries, Ltd.	Hinton	Prairie Creek.
Jasper Coal Co., Ltd.	Edmonton	Prairie Creek.
Lakeside Coal, Ltd.	Edmonton	Coalspur.
McLeod River Hard Coal Co., Ltd.	Mercoal	Coalspur.
Sterling Collieries, Ltd.	Edmonton	Coalspur.

DIRECTORY OF FIRMS—Continued

Coal Mining Industry—Concluded

Name	Head office address	Location
ALBERTA—Concluded		
Lignite		District
Aetna Coal Co., Ltd.	East Coulee	Drumheller.
Alberta Block Coal Co., Ltd.	Drumheller	Drumheller.
Artic Coal Co.	Carbon	Carbon.
Banner Coals, Ltd.	Edmonton.	Edmonton.
Balogh Coal Co., Ltd.	Carbon	Carbon.
Banner Coals, Ltd.	Edmonton.	Edmonton.
Beverley Coal Co., Ltd.	Edmonton.	Edmonton.
Brilliant Coal Co., Ltd.	Drumheller	Drumheller.
Bush Mines, Ltd.	Edmonton.	Edmonton.
Canadian Dinant Coal Co., Ltd.	Dinant.	Camrose and Carbon.
Carbondale Collieries, Ltd.	Edmonton.	Edmonton.
Chester Mine	Lethbridge	Lethbridge.
Chinook Coal Co., Ltd.	Sheerness	Sheerness.
City of Lethbridge Coal Mines	Lethbridge	Lethbridge.
Comet Coal Co., Ltd.	East Coulee	Drumheller.
Commander Coal Co.	Drumheller	Drumheller.
Cotek, W.	South Edmonton.	Edmonton.
Dawson Coal Co., Ltd.	Edmonton.	Edmonton.
Edina Coal Co., Ltd.	Edmonton.	Edmonton.
Elgin Coal Co., Ltd.	Drumheller	Drumheller.
Empire Collieries, Ltd.	East Coulee	Drumheller.
Fraser-Mackay Collieries, Ltd.	10055/101st St., Edmonton.	Edmonton.
Gibb and Ball	Edmonton.	Edmonton.
Gotheridge, W. T. & Sons.	Round Hill	Camrose.
Great West Coal Co., Ltd.	Edmonton.	Edmonton.
Gunderson Brick & Coal Co., Ltd.	Redcliff	Redcliff.
Hamilton, J. J. Coal, Ltd.	Lethbridge.	Lethbridge.
Hy-Grade Coal Co., Ltd.	Drumheller	Drumheller.
Ideal Coal Co., Ltd.	Wayne.	Drumheller.
Keith & Fulton Coal Co.	Clover Bar	Edmonton.
Kent Coal Co., Ltd.	Edmonton.	Edmonton.
Kleenbinn Collieries, Ltd.	Eyremore	Brooks.
Lakeside Coals, Ltd.	Edmonton.	Pembina.
Lethbridge Collieries, Ltd.	Lethbridge.	Lethbridge.
Long Coal Co., Ltd.	Namoo	Edmonton.
Lund, Nelson, Hagblad & Degaust.	Lethbridge.	Lethbridge.
Maple Leaf Minerals, Ltd.	Drumheller	Drumheller.
Marcus Coal Mines, Ltd.	Edmonton.	Edmonton.
McDonnell Coal Co.	Namoo	Edmonton.
Midland Coal Mining Co., Ltd.	Midlandvale	Drumheller.
Monarch Coal Mining Co., Ltd.	Drumheller	Drumheller.
Murray Collieries, Ltd.	East Coulee	Drumheller.
Newcastle Coal Co., Ltd.	Drumheller	Drumheller.
Northern Coal Co., Ltd.	Picture Butte.	Lethbridge.
Oliphant, John	Medicine Hat.	Redcliff.
Oliphant, J. H.	Carbon	Carbon.
Ottewell Coal Co.	Clover Bar	Edmonton.
Parker, L.	Cardiff.	Edmonton.
Peerless Carbon Collieries	Carbon	Carbon.
Pine Creek Coal Co.	South Edmonton.	Edmonton.
Poholka, S.	South Edmonton.	Edmonton.
Red Deer Valley Coal Co., Ltd.	Drumheller	Drumheller.
Red Flame Coal Co.	Round Hill	Camrose.
Red Hot Coal Co., Ltd.	Forest Heights.	Edmonton.
Regal Coal Co., Ltd.	East Coulee	Drumheller.
Riverdale Coal Co.	Edmonton.	Edmonton.
Rock Springs Longwall Coal Co.	Calgary	Taber.
Rollinson, J.	Lethbridge.	Lethbridge.
Rosedale Collieries, Ltd.	Aerial	Drumheller.
Sheerness Coal Co., Ltd.	Sheerness	Sheerness.
Sinoski, M.	Strathcona.	Edmonton.
Stoney Creek Collieries, Ltd.	Camrose.	Camrose.
Super Heat Coal Co.	Ardley.	Ardley.
Superior Grade Coal Co., Ltd.	Wayne.	Drumheller.
Tofield Coal Co., Ltd.	Tofield.	Tofield.
Tredway Bros.	Dodds.	Tofield.
Wayne Coal Producers Assn., Ltd.	Wayne.	Drumheller.
Western Gem and Jewel Collieries, Ltd.	Wayne.	Drumheller.
BRITISH COLUMBIA—		
Beban, Frank, Lumber Co., Ltd.	Nanaimo.	Island.
Bulkley Valley Colliery.	Telkwa.	Inland.
Canadian Collieries (Dunsmuir), Ltd.	Nanaimo.	Island.
Coalmont Collieries, Ltd.	Coalmont.	Inland.
Crow's Nest Pass Coal Co., Ltd.	Fernie.	Crow's Nest Pass.
Granby Cons. M. S. & P. Co., Ltd.	Princeton.	Inland.
Lantzville Collieries, Ltd.	Lantzville.	Island.
Middlesboro Collieries, Ltd.	Merritt.	Inland.
Pleasant Valley Mining Co., Ltd.	Princeton.	Inland.
Tulameen Collieries, Ltd.	Princeton.	Inland.
Western Fuel Corporation of Canada, Ltd.	Nanaimo.	Island.
Wilson Mining & Investment Co., Ltd.	Vancouver.	Inland.

DIRECTORY OF FIRMS—Continued

Natural Gas Industry

- (a) Drilling only. (d) Dry wells drilled in 1937.
 (b) Distributing only. (e) Drilling and producing.
 (c) Producing wells drilled in 1937—no output reported. (f) Pipeline company.
 (g) Using or selling gas from absorption plant.

Name	Head office address	Location
NEW BRUNSWICK—		
New Brunswick Gas & Oilfields, Ltd.	Moncton	Field
(b) Moncton Electricity & Gas Co., Ltd.	Moncton	Stony Creek.
ONTARIO—		
Acme Gas & Oil Co., Ltd.	Suite 1602, 330 Bay St., Toronto.	Middleton.
(e) Ajax Oil & Gas Co., Ltd.	85 Richmond St. W., Toronto.	Dover, Middleton, Norfolk, Raleigh and Tuscarora.
(a) Allen, A. J.	Dunnville	Township
Aloka Oil Co., Ltd.	57 Queen St. W., Toronto.	Dereham.
Amity Gas Co.	Lowbanks	Moulton.
(c) A. P. K. Group	Toronto	North Cayuga.
Aragain Gold & Natural Gas Syndicate.	34 King St. E., Toronto.	Canboro.
Avery, Esmond & Company	5172 St. Jean Ave., Detroit, Mich., U.S.A.	Cayuga North.
(c) Babcock, Miss.	Picton	Marysburg.
Barnhart, Mrs. E. L.	Stevensville	Bertie.
Beacon Natural Gas Syndicate	112 Locust St., Kitchener.	Walpole.
Beer, Geo.	Binbrook	Binbrook.
Benn, A. S.	Hagersville	Walpole.
Bertie Gas Co.	Selkirk	Bertie.
Binbrook Gas Co.	Binbrook	Binbrook.
Blackheath Gas Co.	639 Penobscot Bldg., Detroit, Mich., U.S.A.	Seneca.
Broadway Gas Syndicate	Paris	Walpole.
Buck, C. S.	Port Rowan	Walsingham South.
(c) Buffalo Drilling Co.	2002 Rand Bldg., Buffalo, N.Y., U.S.A.	Onondaga.
Burehell Natural Gas & Oil Syndicate	1111 Canada Permanent Bldg., Toronto	Canboro, Raleigh and Woodhouse.
Canada Cement Co., Ltd.	Port Colborne	Wainfleet.
Canadian Natural Gas Syndicate	Simcoe	Bayham and Moulton.
Canby, B. F.	Wainfleet	Wainfleet.
Canfield Gas Syndicate	703 Capitol Park Bldg., Detroit, Mich., U.S.A.	Cayuga North.
Canfield Natural Gas Co., Ltd.	Canfield	Cayuga North.
(d) Carefoot, E. M.	Belleville	Hastings County.
Cartwright, S. E.	1970 Penobscot Bldg., Detroit, Mich., U.S.A.	Walpole.
(e) Central Pipe Line Co., Ltd.	Chatham	Bayham, Dereham, Houghton and Middleton.
Central Seneca Gas Syndicate	Cayuga	Seneca.
(b) City Gas Company of London	215 Dundas St., London	Walpole.
Colbert, M. A.	Welland Junction	Canboro and Wainfleet.
Coleman, J. A.	Wellandport	Canboro and Moulton.
Colonial Natural Gas and Oil Co.	Stoney Creek	Dunn.
Columbia Natural Gas & Oil Co., Ltd.	515 Pigott Bldg., Hamilton	Rainham.
Comins, H. M.	Flint, Mich., U.S.A.	Bayham.
Connor & McKechnie	Dunnville	Binbrook and Walpole.
Continental Gas Corp.	304/307 McKinnon Bldg., Toronto	Bertie.
Coronation Gas Syndicate	Stevensville	Moulton and Oneida.
(e) Culver, W. H. Estate	Dunnville	Middleton.
Dawson, Ralph	Merlin	Tilbury East.
Dean Gas Syndicate	Tilsonburg	Middleton.
Delhi Gas Syndicate	Cayuga	Windham.
(d) Dereham Gas and Oil Co.	288 Bay St., Toronto	Dereham.
Domestic Gas Syndicate	36 Toronto St., Toronto	Moulton, Rainham, Seneca & Walpole.
Dominion Natural Gas Co., Ltd.	518 Jackson Bldg., Buffalo, N.Y., U.S.A.	Bayham, Binbrook, Caistor, Canboro, Cayuga, (North and South), Charlotteville, Dunn, Glanford, Houghton, Humberstone, Malahide, Middleton, Moulton, Oneida, Onondaga, Rainham, Seneca, Sherbrooke, Townsend, Wainfleet, Walpole, Walsingham (North and South), Windham and Woodhouse.
Dunnville-Detroit Gas Co.	Dunnville	Cayuga North.
East Side Gas Co.	Lowbanks	Sherbrooke.
(d) Economy Natural Gas Syndicate	Stratford	Moulton, Walpole and Woodhouse.
Emerald Gas Syndicate	288 Bay St., Toronto	Moulton and Oneida.
(e) Emerson, H. L.	Dunnville	Canboro and Moulton.
Empire Gas, Ltd.	25 King St. W., Toronto	Walpole and Walsingham South.
Erie Gas, Limited	9 Toronto St., Toronto	Woodhouse.
(a) Evans, H.	Brownsville	

DIRECTORY OF FIRMS—Continued

Natural Gas Industry—Continued

Name	Head office address	Location
ONTARIO—Continued		Township
Fairbank Oil and Gas Syndicate	60 Front St. W., Toronto	Enniskillen.
Firelite Gas & Oil Co., Ltd.	80 Richmond St. W., Toronto	Oneida, Rainham, Walpole and Walsingham South.
Fisherville Gas Co.	Fisherville	Rainham.
Gas Producers Co.	703 Capital Park Bldg., Detroit, Mich., U.S.A.	Raleigh.
Gifford, A., & Son	Cayuga	Cayuga South.
(e) Glenn, D.	Dunnville	Canboro.
Grand River Gas & Oil Syndicate	Canfield	Cayuga North.
Grand River Gas Co.	Cayuga	Moulton.
(a) Gregory, Geo. F., & Son	Petrolia	
Grimsby Natural Gas Co., Ltd.	Grimsby	Caistor and Gainsboro.
(d) Gubb & Russell	703 Capital Park Bldg., Detroit, Mich., U.S.A.	Bayham, Dawn and Raleigh Rainham.
Haldimand Gas Co.	Cayuga	Bertie.
Haldimand Natural Gas Syndicate	Stevensville	Raleigh.
Highbank Oil, Limited	215 King St. W., Chatham	Tilbury East.
Hill, A. W.	Coatsworth	Bayham.
(a) Holmes, A. B., and Rodgers, A. L.	166 Jamieson Ave., Toronto	
(a) Hoover, A. E.	Selkirk	
Hope Gas Syndicate	43 Ontario St., St. Catharines	Moulton.
(a) House, Charles C.	Stevensville	
House & Harris	Stevensville	Bertie.
(a) Hussey, W. J.	Petrolia	
Ideal Gas Syndicate	Fisherville	Rainham.
(e) Jackson, Percy L.	Dunnville	Canboro and Moulton.
(c) Jackson and Graff	Dunnville	Crowland.
(e) Jaspersen, Bon.	Kingsville	Gosfield South.
Kelly Gas & Oil Syndicate	15 Drayton Ave., Toronto	Rainham and Walpole.
(a) Kidd, L. W.	18 Strathearn Rd., Toronto	
Kindy, D., & Son	Selkirk	Rainham.
(a) Kiser Bros.	90 Park St., Chatham	
Ladd & Kaban	1957 Penobscot Bldg., Detroit, Mich., U.S.A.	Tilbury East.
Ladd & Knight	1957 Penobscot Bldg., Detroit, Mich., U.S.A.	Walpole.
Ladd-Knight-Medina Natural Gas Company, Ltd.	1957 Penobscot Bldg., Detroit, Mich., U.S.A.	Dover.
Ladd and Zeigen	1957 Penobscot Bldg., Detroit, Mich., U.S.A.	Tilbury East.
(c) (d) Lake Erie Gas Co.	57 Queen St. W., Toronto	Walpole.
(a) Lauer, D. G.	Tillsonburg	
(b) Leamington, Town of	Leamington	
Lincoln Gas Co., Ltd.	10 Adelaide St. E., Toronto	Caistor, Canboro and Gainsboro.
Lindsay, William B., Estate of	Canada Permanent Bldg., Edmonton, Alberta	Canboro, Rainham and Walpole.
(e) Lymburner Bros. & Webber	Dunnville	Moulton, Rainham and Walpole.
Lynn Valley Gas & Oil, Ltd.	43 Alberta St., Waterloo	Oneida.
(b) Manufacturers Natural Gas Co., Ltd.	518 Jackson Bldg., Buffalo, N.Y., U.S.A.	
May-Gold and Natural Gas Syndicate	Canboro	Canboro.
(a) McCutcheon, Thos. J. and T. O.	Dunnville	
(e) McKechnie, S.	Dunnville	Walpole.
McKechnie & Hussey	Dunnville	Canboro.
(a) McMaster, Robert and Sons	Onondaga	
(c) McNamara Construction Co.	Toronto	Tilbury East.
(a) McNinch, S. E.	Canboro	
Melrose Gas Co.	911 Kent Bldg., Toronto	Oneida.
Middleton-Norfold Gas Co., Ltd.	52 Young St., Stratford	Middleton.
Midfield Gas Corp., Ltd.	810 Federal Bldg., Toronto	Cayuga North and Oneida.
Midwal Oil & Gas Co., Ltd.	19 Lakeside Ave., Toronto	Cayuga South, Middleton and Walsingham North.
Minnicog Gas Company	5172 St. Jean Ave., Detroit, Mich., U.S.A.	Cayuga North.
Mohawk Gas & Oil Syndicate, Ltd.	421 Main St. E., Hamilton	Canboro, Oneida and Walpole.
Monarch Gas & Oil Syndicate	Fisherville	Walpole.
Mutual Natural Gas Co.	372 Bay St., Toronto	Rainham.
National Gas Syndicate	Dunnville	Seneca.
Nelles Corners Gas Co.	Hagersville	Cayuga North and Rainham.
New Eden Natural Gas Co., Ltd.	Simcoe	Bayham.
New Tillsonburg Oil & Gas Co. Ltd.	26 Adelaide St. W., Toronto	Middleton.
Niagara Natural Gas Co., Ltd.	72 East Main St., Welland	Moulton.
Niece, Elmond	Lowbanks	Sherbrooke.
Norhal Gas and Oil, Ltd.	10 McNab St. S., Hamilton	Walpole.
North Cayuga Gas Syndicate	1673 Beacon St., Brookline, Mass., U.S.A.	Cayuga North.
Northern Gas & Gasoline Co.	Hepworth	Amabel.
North Shore Gas Co.	Selkirk	Rainham.
Nottawa Oil & Gas Co., Ltd.	546 Confederation Life Bldg., Toronto	Amabel, Cayuga South, Keppel, Onondaga, Rainham, Wainfleet and Walpole.
(b) Oil Springs Oil & Gas Co., Ltd.	Oil Springs	
(b) Ontario Salt Co. (J. R. Robert)	1428 Erie St. E., Windsor	
Otter River Gas Co.	Tillsonburg	Middleton.
(f) Oxford Pipe Line Co., Ltd.	Dunnville	

DIRECTORY OF FIRMS—Continued

Natural Gas Industry—Continued

Name	Head office address	Location
ONTARIO—Concluded		Township
Patterson, W. C., Gas Co., Ltd.....	Box 914, Jamestown, N.Y., U.S.A.....	Bayham, Cayuga North, Crowland, Dereham, Dunn, Humberstone, Rainham, Walpole, and Willoughby. Dawn and (d) Tilbury East.
Perdue, J.....	Chatham.....	
(a) Perkins, J. E.....	Dunnville.....	
Petrol Oil & Gas Co., Ltd.....	414 Bay St., Toronto.....	Dover, Oneida, Onondaga and Tuscarora.
Pine Ridge Gas Co., Ltd.....	Dunnville.....	Dereham.
Port Colborne-Welland Gas & Oil Co., Ltd.....	Port Colborne.....	Oneida, Onondaga and Seneca.
Povac Gas Syndicate.....	Tillsonburg.....	Canboro and Mersea.
Prairie Gas & Oil Co., Ltd.....	350 Bay St., Toronto 2.....	Dover.
Premier Oils, Limited.....	539A St. Clair Ave. W., Toronto.....	Onondaga.
Provincial Gas Co., Limited.....	Port Erie North.....	Bertie, Crowland, Humberstone and Willoughby.
Rainham Gas Syndicate.....	Cayuga.....	Rainham and Seneca.
Reicheld, F. W.....	Jarvis.....	Walpole.
Rich Gas Co.....	18 Lola Rd., Toronto.....	Moulton.
Ricker, Arthur.....	Canboro.....	Canboro.
Riley, J. V.....	Simcoe.....	Moulton.
River Valley Natural Gas Syndicate.....	112 Yonge St., Toronto.....	Oneida.
Romney Oil & Gas Co.....	18 Toronto St., Toronto.....	Romney, Tilbury East and Wainfleet.
(e) Roth, Frank & Harvey.....	Dunnville.....	Bertie.
(e) Rowe, E. P.....	350 Bay St., Toronto.....	Bayham, Dover East, Middleton and Raleigh.
Salina Gas Co., Ltd.....	47 Sixth St., Chatham.....	(d) Raleigh and Tilbury East.
Sandusk Gas Syndicate.....	Fisherville.....	Walpole.
Sarnia Oil & Gas Co.....	350 Bay St., Toronto.....	Enniskillen and Sarnia.
Security Gas Syndicate.....	Windsor.....	Binbrook, Glanford and Seneca.
Shelton, S. F.....	York.....	Seneca.
Shepherd, E.....	Dunnville.....	Canboro.
Sherk, John M.....	Ridgeway.....	Bertie.
Smith, Armand M.....	St. Thomas.....	Bayham and (d) Dereham.
(e) Smith and Ehde.....	Lowbanks.....	Moulton.
Southern Ontario Gas Co., Ltd.....	518 Jackson Bldg., Buffalo, N.Y., U.S.A.....	Mersea, Raleigh, Romney, and Tilbury East.
(d) Spalding, E., Syndicate.....	Hagersville.....	Malahide.
Springvale Gas & Oil Co., Ltd.....	Fisherville.....	Walpole.
Standard Gas & Oil Syndicate.....	Fisherville.....	Rainham and Walpole.
Sterling Gas Co., Ltd.....	7 Quebec St. W., Guelph.....	Walpole.
Stevensville Natural Gas & Fuel Co.....	Stevensville.....	Bertie.
(e) Stewart and Stewart.....	Jarvis.....	Walpole.
(e) Stover, F. H. and Associates.....	Chatham.....	Dover, Raleigh and (d) East Tilbury.
Stromwell Syndicate.....	Tilsonburg.....	Moulton.
(a) Stubble, H. H.....	207 Pattison Ave., Chatham.....	
(c) Sundry, B. K.....	Tillsonburg.....	
Superior Gas Syndicate.....	Fisherville.....	Rainham.
Sweets Corners Gas & Oil Syndicate.....	Fisherville.....	Rainham.
Tanner, F. O.....	General Motors Bldg., Detroit, Mich., U.S.A.....	(e) Cayuga North and Oneida.
Treleaven, A.....	98 Central Ave., London.....	Dereham.
Turkey Point Co.....	Simcoe.....	Charlottetown.
Union Gas Co. of Canada, Ltd.....	52 Fifth Ave., Chatham.....	Canboro, Cayuga North, Cayuga South, Dawn, Dover, Rainham, Raleigh, Romney, Seneca and Tilbury East.
(b) United Gas and Fuel Company of Hamilton, Ltd.....	82/84 King St. E., Hamilton.....	
Vacuum Gas & Oil Co., Ltd.....	350 Bay St., Toronto.....	Middleton.
Victoria Gas Co.....	Dunnville.....	Rainham and Walpole.
(d) Volcanic Gas and Oil Co.....	Toronto.....	Easthope North, Missouri East, Tilbury North, Tilbury West.
Walpole Gas Syndicate.....	Cayuga.....	Walpole.
(e) Walter Gas Syndicate, Ltd.....	3020 Bailey Ave., Buffalo, N.Y., U.S.A.....	(d) Bayham, Middleton, Townsend and Woodhouse.
Welland County Gas Syndicate.....	Stevensville.....	Bertie.
Western Ontario Natural Gas Co., Ltd.....	Victory Bldg., Toronto.....	Canboro, Cayuga North, Dereham, Dunn and Sherbrooke.
(b) Windsor Gas Co., Ltd.....	Windsor.....	
York Gas Syndicate.....	25 King St. W., Toronto.....	Oneida and Seneca.

DIRECTORY OF FIRMS—Continued

Natural Gas Industry—Concluded

Name	Head office address	Location
SASKATCHEWAN—		
Colony Oil & Gas Co., Ltd.	Lloydminster	Lloydminster.
Lloydminster Gas Co., Ltd.	Lloydminster	Lloydminster.
ALBERTA—		
Advance Oil Co., Ltd.	200 Leeson-Lineham Block, Calgary	Turner Valley.
Alberta Clay Products Co.	Medicine Hat.	Medicine Hat.
Associated Oil & Gas Co., Ltd.	200 Leeson-Lineham Block, Calgary	Turner Valley.
Baltic Oils, Ltd.	200 Leeson-Lineham Block, Calgary	Turner Valley.
(b) Bow Island, Town of.	Bow Island.	
(g) British American Oil Co., Ltd.	Royal Bank Bldg., Toronto, Ont.	
British Dominion Oil & Development Corp., Ltd.	208 Dominion Bank Bldg., Calgary	Turner Valley.
Calgary Power Co., Ltd.	244 St. James St., Montreal, P.Q.	Bassano.
Canadian Maple Leaf Royalties, Ltd.	Central Bldg., Calgary	Highwood.
Canadian Pacific Railway Company.	Medicine Hat.	Medicine Hat.
Canadian Western Natural Gas, Light Heat & Power Co., Ltd.	215 Sixth Ave. W., Calgary	Brooks and Foremost.
Canadian Western Power & Fuel Co., Ltd.	Redcliff.	Redcliff.
Carleton Royalties, Ltd.	303 Lancaster Bldg., Calgary	Turner Valley.
Century Royalties, Ltd.	3004, 4th St. W., Calgary	Turner Valley.
Dalhousie Oil Co., Ltd.	606 Second St. W., Calgary	Turner Valley.
Davies Petroleum, Ltd.	714 Standard Bank Bldg., Vancouver, B.C.	Turner Valley.
Dominion Glass Co., Ltd.	1111 Beaver Hall Hill, Montreal, P.Q.	Redcliff.
East Crest Oil Co., Ltd.	409 Maclean Block, Calgary	Turner Valley.
Foothills Oil & Gas Co., Ltd.	606 Second St. W., Calgary	Turner Valley.
(g) Gas & Oil Products, Ltd.	303 Lancaster Bldg., Calgary	
Gold Standard Oils, Ltd.	Wainwright.	Wainwright.
Gunderson Brick & Coal Co., Ltd.	Redcliff.	Redcliff.
Hargal Oils, Ltd.	1007 Stock Exchange Bldg., Vancouver	Wainwright.
Highwood-Saree Oils, Ltd.	614 Lancaster Bldg., Calgary	Turner Valley.
Hudson's Bay Oil & Gas Co., Ltd.	79 Main St., Winnipeg, Man.	Viking.
Hylo Oils, Ltd.	118 Renfrew Bldg., Calgary	Turner Valley.
Lowery Petroleum, Ltd.	44 Victoria St., Toronto, Ont.	Turner Valley.
Maple Leaf Milling Co., Ltd.	Medicine Hat.	Medicine Hat.
Maple Leaf Oil Co., Ltd.	708 Stock Exchange Bldg., Vancouver, B.C.	Fabyan.
Medicine Hat Brick & Tile Co., Limited	Medicine Hat.	Medicine Hat.
Medicine Hat, City of.	Medicine Hat.	Medicine Hat.
Model Oils, Ltd.	7 Cameron Block, Calgary	Turner Valley.
Moose Oils, Ltd.	714 Lancaster Bldg., Calgary	Moose Dome.
National Petroleum Corp., Ltd.	305 Foothills Bldg., Calgary	Turner Valley.
Northwestern Utilities, Ltd.	10124, 104th St., Edmonton	Viking.
Ogilvie Flour Mills Co., Ltd.	Medicine Hat.	Medicine Hat.
Oil Investors, Ltd.	705 Lancaster Bldg., Calgary	Turner Valley.
(g) Oilwell Machine Co.	Turner Valley.	
O'Neil, W. N., Company, Ltd.	Coutts.	Red Coulee.
Range Oil & Gas Co., Ltd.	101 Canadian Bank of Commerce Bldg., Calgary	Border.
Redcliff Premier Brick Co., Ltd.	Redcliff.	Redcliff.
Redcliff Pressed Brick Co.	Redcliff.	Redcliff.
Renfrew Royalty Co., Ltd.	705 Lancaster Bldg., Calgary	Turner Valley.
Richfield Royalties, Ltd.	705 Lancaster Bldg., Calgary	Turner Valley.
Royalite Oil Co., Ltd.	606 Second St. W., Calgary	Turner Valley.
Share Royalties, Ltd.	61 Canada Life Bldg., Calgary	Turner Valley.
Southwest Petroleum Co., Ltd.	606, 2nd St. W., Calgary	Turner Valley.
Sovereign Royalties, Ltd.	317 Alberta Corner, Calgary	Turner Valley.
Spooner Oils, Ltd.	717 Lancaster Bldg., Calgary	Turner Valley.
Sterling Royalties, Ltd.	303 Lancaster Bldg., Calgary	Turner Valley.
Suffield, Village of.	Suffield.	Suffield.
Sunset Oils, Ltd.	302 Toronto General Trusts Bldg., Calgary	Turner Valley.
Turner Valley Royalties, Ltd.	232 Lougheed Bldg., Calgary	Turner Valley.
Vanalta Limited.	Granville Island, Vancouver, B.C.	Red Coulee.
(b) Wainwright Gas Co., Ltd.	36 Dominion Bank Bldg., Edmonton	
Wetaskiwin, City of.	Wetaskiwin.	Wetaskiwin.
NORTHWEST TERRITORIES—		
Northwest Co., Ltd.	606 Second St. W., Calgary	Fort Norman.

Peat Industry

ONTARIO—		
Leasa, Wm.	Milverton.	Ellice Tp.
Runke, George & Sons.	Kitchener.	Waterloo Tp.
Wagler, Gideon.	Linwood.	Waterloo Tp.

DIRECTORY OF FIRMS—Continued

Crude Oil Producers in Canada, 1937

Name	Head office address	Location
NEW BRUNSWICK—		
New Brunswick Gas & Oilfields, Ltd.	Moncton	Field Stony Creek.
ONTARIO (*)—		
Aetna Oil Co., Ltd.	Windsor	Bothwell.
Atkinson, John	Petrolia	Petrolia and Enniskillen.
Barnes, Henry	Oil Springs	Oil Springs.
Brock, Thos.	Petrolia	Petrolia and Enniskillen.
Brown, J. F.	Corunna	Moore.
Bryson, G. C.	Petrolia	Petrolia and Enniskillen.
Byers Bros.	Oil Springs	Oil Springs.
Byers, Mrs. Lydia	Oil Springs	Oil Springs.
Canadian Oil Refineries, Ltd.	12 Strachan Ave., Toronto	Petrolia and Enniskillen.
Carmody, J.	Brantford	Onondaga.
Colchester Oil and Gas Co.	Toronto	Thamesville.
Cole, W. J.	Petrolia	Petrolia and Enniskillen.
Collins, Matthew	Petrolia	Petrolia and Enniskillen.
Crocker-Parks Oil Co., Ltd., The	Oil Springs	Oil Springs.
Delhi Gas Syndicate	Cayuga	Bothwell.
Dennis, Charles	Oil Springs	Oil Springs.
Dennis, Garnet	Oil Springs	Oil Springs.
Dennis, Welcome	Oil Springs	Oil Springs.
Dewhurst, Murray	Petrolia	Petrolia and Enniskillen.
Domestic Natural Gas and Oil Co., Ltd.	36 Toronto St., Toronto	Bothwell.
Dominion Petroleum Co., Ltd., The	Bank of Montreal Bldg., London	Mosa.
Donald, George	Oil Springs	Oil Springs.
Drake and Walker	Walkerville	East Tilbury.
(b) Edward, F. H.	Petrolia	Petrolia and Enniskillen.
Fairbank, J. H., Estate of	Petrolia	Oil Springs.
Forsythe, A.	Copleston	Petrolia and Enniskillen.
Gillespie, Wm. O.	Petrolia	Petrolia and Enniskillen.
Goudie, Elroy	Petrolia	Petrolia and Enniskillen.
Hamlin, F. G.	Petrolia	Petrolia and Enniskillen.
(a) Heal, A. A.	Corunna	
Hillis Bros.	Oil Springs	Oil Springs.
Hodge, Gerald		Brooke.
(b) Holmes, E. B.	Bothwell	Bothwell.
Houston, Mrs. Annie	London	Petrolia and Enniskillen.
(b) Howlett, Fred W., & Sons, Ltd.	Petrolia	Petrolia and Enniskillen.
Kay, W. R.	Oil Springs	Oil Springs.
(b) Kells, E. E.	Petrolia	Petrolia and Enniskillen.
Kelly, J. E.	Petrolia	Petrolia and Enniskillen.
Kerr, John, Estate of	Petrolia	Petrolia and Enniskillen.
Lather, Arthur	Bothwell	Bothwell.
Lather, D. C. & R.	Bothwell	Bothwell.
Lawton, H. B.	10040 Freeland Ave., Detroit, Mich., U.S.A.	Moore.
Lewis Bros.	Oil Springs	Oil Springs.
(a) Lewis, J. R.	Williamsville, N.Y.	
Lidster, Harold		Dunwich.
Loton, Percy	Bothwell	Bothwell.
McCort & Flett	Petrolia	Petrolia and Enniskillen.
(a) McGaffey, R.	Bothwell	
McGill, J.	Bothwell	Bothwell.
McIntosh Oil & Gas Co.	Petrolia	Petrolia and Enniskillen.
McMillan, D. C. & Warwick, J.	Bothwell	Bothwell.
McNamara Construction Co.	Toronto	Tilbury East.
Mitchell, Chas.	Oil Springs	Oil Springs.
Mitchell, D. J.	Glencoe	Mosa.
Mitchell, Robert	Oil Springs	Oil Springs.
Morningstar, H. M.	Oil Springs	Oil Springs.
Morningstar, L. H.	Oil Springs	Oil Springs.
Morris, George	Petrolia	Petrolia and Enniskillen.
Ontario Lands & Oil Co., Ltd., The	Petrolia	Petrolia and Enniskillen.
Parks, Blake	Petrolia	Petrolia and Enniskillen.
Patterson, F. L.	Petrolia	Moore.
Petrol Oil and Gas Co., Ltd.	414 Bay St., Toronto	Dover.
Prairie Gas and Oil Co., Ltd.	550 Bay St., Toronto	Dover.
Pope, Wm.	Bothwell	Bothwell.
Randle, Herbert	Bothwell	Bothwell.
Rawson, W. J.	Petrolia	Petrolia and Enniskillen.
Rose, H. P.	Petrolia	Petrolia and Enniskillen.
Rowe, E. P.	404 Atlas Bldg., Toronto	Dover.
Sarolina Oil Co.	Petrolia	Petrolia and Enniskillen.
Slack, Chas.	Petrolia	Petrolia and Enniskillen.
(a) Smith, C. A.	Brigden	
Sproule Bros.	Oil Springs	Oil Springs.
Sutherland, B. M.	Petrolia	Oil Springs.
Union Gas Co. of Canada, Ltd.	Gas Bldg., Fifth St., Chatham	Dawn.
(b) Von Berg J.	8070 East Outer Drive, Detroit, Mich., U.S.A.	Bothwell.

DIRECTORY OF FIRMS—Continued

Crude Oil Producers in Canada, 1937—Continued

Name	Head office address	Location
ONTARIO (*)—Concluded		
Wallen & Wallen, Estate of.....	Oil Springs.....	Oil Springs.
Ward, N.....	Petrolia.....	Petrolia and Enniskillen.
Warwick, J.....	Oil Springs.....	Oil Springs.
(a) Willits, D. E.....	Bothwell.....	
(a) Wilson, Bert.....	Sarnia.....	
(a) Windover, Wm.....	Sarnia.....	
Winnett, J. W. G.....	418½ Talbot St., London.....	Bothwell.
Woodward, Wm.....	Oil Springs.....	Oil Springs.
Yerks, Carlton S.....	Petrolia.....	Petrolia and Enniskillen.
Yerks, Frank.....	Petrolia.....	Petrolia and Enniskillen.
(*) Producers of 300 barrels or more during the year.		
(a) Drillers only.		
(b) Producer and driller.		
ALBERTA—		
Advance Oil Co., Ltd.....	200 Leeson-Lineham Block, Calgary.....	Turner Valley.
(c) Arca Development Co.....	215, 6th Ave. W., Calgary.....	High River.
Associated Oil & Gas Co., Ltd.....	200/203 Leeson-Lineham Block, Calgary.....	Turner Valley.
B. & B. Royalties, Ltd.....	232 Loughheed Bldg., Calgary.....	Turner Valley.
Baltac Oils, Ltd.....	200/203 Leeson-Lineham Block, Calgary.....	Turner Valley.
(c) Barsac Royalties, Ltd.....	Toronto General Trusts Bldg., Calgary.....	Turner Valley.
(c) Battle View Oils, Ltd.....	Suite 1007, 80 Richmond St. W., Toronto, Ont.....	
Bethwain Oils, Ltd.....	73 Adelaide St. W., Toronto, Ont.....	Battle View.
(d) British American Oil Co., Ltd.....	1312 Royal Bank Bldg., Toronto, Ont.....	Wainwright.
British Dominion Oil & Development Corp., Ltd.....	208 Dominion Bank Bldg., Calgary.....	Turner Valley.
British Wainwright Oil & Development Co., Ltd.....	703 Paris Bldg., Winnipeg, Man.....	Wainwright.
Brown Oil Corp., Ltd.....	232 Loughheed Bldg., Calgary.....	Turner Valley.
(c) Canadian Maple Leaf Royalties, Ltd.....	1 Central Bldg., Calgary.....	Highwood-Sinclair.
Carleton Royalties, Ltd.....	303 Lancaster Bldg., Calgary.....	Turner Valley.
Century Royalties, Ltd.....	3004, 4th St. W., Calgary.....	Turner Valley.
(c) Command Oils, Ltd.....	409 Lancaster Bldg., Calgary.....	Turner Valley.
Commoll, Ltd.....	409 Lancaster Bldg., Calgary.....	Turner Valley.
Dalhousie Oil Co., Ltd.....	606 Second St. West, Calgary.....	Turner Valley.
Davies Petroleum, Ltd.....	714 Standard Bank Bldg., Vancouver, B.C.....	Turner Valley.
(c) Dima Oil & Refining Co., Ltd.....	Lloydminster, Sask.....	Ribstone.
Director Royalties, Ltd.....	600 Lancaster Bldg., Calgary.....	Turner Valley.
East Crest Oil Co., Ltd.....	409 Maclean Block, Calgary.....	Turner Valley.
Edmonton Wainwright Oils, Ltd.....	8 McDougall Court, Edmonton.....	Wainwright.
(c) Elbow Oil Co., Ltd.....	29 Michael Bldg., Calgary.....	Birch Ridge.
Firestone Petroleum, Ltd.....	902 Lancaster Bldg., Calgary.....	Turner Valley.
Foothills Oil & Gas Co., Ltd.....	606 Second St. W., Calgary.....	Turner Valley.
Foundation Petroleum, Ltd.....	902 Lancaster Bldg., Calgary.....	Turner Valley.
Four Star Petroleum, Ltd.....	232 Loughheed Bldg., Calgary.....	Turner Valley.
(c) Franco Oils, Ltd.....	Cardston.....	Cardston.
(d) Gas & Oil Products, Ltd.....	300 Lancaster Bldg., Calgary.....	Turner Valley.
(c) Globe Royalties, Ltd.....	Prudential Trust Co., Calgary.....	Turner Valley.
Granville Oils, Ltd.....	638 Columbia St., New Westminster, B.C.....	Turner Valley.
Hargal Oils, Ltd.....	1007 Stock Exchange Bldg., Vancouver, B.C.....	Wainwright.
Highwood-Sarcee Oils, Ltd.....	614 Lancaster Bldg., Calgary.....	Turner Valley.
(c) Home Oil (Alberta), Ltd.....	226 Loughheed Bldg., Calgary.....	Turner Valley and Coutts.
(c) Hunter Valley Oil Co., Ltd.....	209 Loughheed Bldg., Calgary.....	Hunter Valley.
Hylco Oils, Ltd.....	124 Seventh Ave. W., Calgary.....	Turner Valley.
(c) Lethbridge Petroleum & Refineries, Ltd.....	36 Union Bldg., Calgary.....	Lethbridge.
(c) London Ribstone Petroleum, Ltd.....	Suite 3, 925 Bute Street, Vancouver, B.C.....	Ribstone.
Lowery Petroleum, Ltd.....	44 Victoria St., Toronto, Ont.....	Turner Valley.
Mar-Jon Oil Co., Ltd.....	828 Rogers Bldg., Vancouver, B.C.....	Turner Valley.
(c) Maxmont Oil Co.....	Lundbreck.....	Watson.
Mercury Oils, Ltd.....	300 Lancaster Bldg., Calgary.....	Turner Valley.
Merland Oil Co. of Canada, Ltd.....	227 Examiner Bldg., Calgary.....	Turner Valley.
Mill City Petroleum, Ltd.....	300 Lancaster Bldg., Calgary.....	Turner Valley.
Miracle Oils, Ltd.....	300 Lancaster Bldg., Calgary.....	Turner Valley.
Model Oils, Ltd.....	7 Cameron Block, Calgary.....	Turner Valley, (c) Moose Dome.
Model Spooner Syndicate.....	717 Lancaster Bldg., Calgary.....	Turner Valley.
Monarch Royalties, Ltd.....	902 Lancaster Bldg., Calgary.....	Turner Valley.
(c) Montreal-Alberta Petroleum, Ltd.....	19 King St. E., Kitchener, Ont.....	Wainwright.
Moose Oils, Ltd.....	714 Lancaster Bldg., Calgary.....	Moose Dome.
McDougall-Segur Exploration Co. of Canada, Ltd.....	405 Eight Ave. W., Calgary.....	Turner Valley.
National Petroleum Corporation, Ltd.....	305 Foothills Bldg., Calgary.....	Turner Valley.
Newfold Royalties, Ltd.....	232 Loughheed Bldg., Calgary.....	Turner Valley.
(c) New Valley Oil Co., Ltd.....	202 Grain Exchange Bldg., Calgary.....	New Valley.
Northwest Company, Ltd.....	606 Second St. W., Calgary.....	Turner Valley.
Oil Investors, Ltd.....	705 Lancaster Bldg., Calgary.....	Turner Valley.
(c) Okalta Oils, Ltd.....	Renfrew Bldg., Calgary.....	Turner Valley.
O'Neil (W.N.) Co., Ltd.....	Johnson St., Vancouver, B.C.....	Red Coulee.

DIRECTORY OF FIRMS—Continued

Crude Oil Producers in Canada, 1937—Concluded

Name	Head office address	Location
ALBERTA—Concluded		
Pacalta Operating Royalty Holders Committee	3004 Fourth St. W., Calgary	Turner Valley.
(c) Phillips Petroleum, Ltd.	818 Lancaster Bldg., Calgary	Turner Valley.
(c) Plains Petroleum Corp.	C.P.R. Bldg., Toronto, Ont.	Taber.
Prairie Royalties, Ltd.	902 Lancaster Bldg., Calgary	Turner Valley.
(c) Ranchmen's Gas & Oil Co., Ltd.	410 Grain Exchange Bldg., Calgary	Aldersyde.
Renfrew Royalty Co., Ltd.	705 Lancaster Bldg., Calgary	Turner Valley.
Richfield Petroleum, Ltd.	406 Lancaster Bldg., Calgary	Turner Valley.
(c) Richfield Royalties, Ltd.	705 Lancaster Bldg., Calgary	Turner Valley.
(c) Rich-Well Oil Co., Ltd.	502 Lancaster Bldg., Calgary	Turner Valley.
(c) Roxana Petroleum, Ltd.	809 Lancaster Bldg., Calgary	Kootenay Dome.
Royal Canadian Oils, Ltd.	818 Lancaster Bldg., Calgary	Turner Valley.
Royal Crest Petroleum, Ltd.	232 Lougheed Bldg., Calgary	Turner Valley.
(c) Royalite Oil Co., Ltd.	606 Second St. W., Calgary	Turner Valley.
Sasko-Wainwright Oil & Gas, Ltd.	103 Bowerman Bldg., Saskatoon, Sask.	Wainwright.
(c) Scottish Petroleum, Ltd.	817 Lancaster Bldg., Calgary	Turner Valley.
(c) Sentinel Oils, Ltd.	10 Clarence Block, Calgary	Turner Valley.
Share Royalties, Ltd.	61 Canada Life Bldg., Calgary	Turner Valley.
Southwest Petroleum Co., Ltd.	606 Second St. W., Calgary	Turner Valley.
Sovereign Royalties, Ltd.	317 Alberta Corner, Calgary	Turner Valley.
(c) Spindletop Oils, Ltd.	408 Lancaster Bldg., Calgary	Duncan.
Spoonier Oils, Ltd.	717 Lancaster Bldg., Calgary	Turner Valley.
(c) Spy Hill Royalties	902 Lancaster Bldg., Calgary	Turner Valley.
Sterling Royalties, Ltd.	303 Lancaster Bldg., Calgary	Turner Valley.
Structure Oil & Gas Co., Ltd.	Canadian Credit Men's Trust Association, Ltd., Trustee, Calgary	Turner Valley.
(c) Sunburst Oil Co.	31 Canada Life Bldg., Calgary	Turner Valley.
(c) Sundance Royalties, Ltd.	902 Lancaster Bldg., Calgary	Turner Valley.
Sunset Oils, Ltd.	302 Toronto General Trusts Bldg., Calgary	Turner Valley.
(c) Sunshine Oils, Ltd.	816 Hall Bldg., Vancouver, B.C.	Del Bonita.
Three Point Petroleum, Ltd.	232 Lougheed Bldg., Calgary	Turner Valley.
Turner Valley Royalties, Ltd.	232 Lougheed Bldg., Calgary	Turner Valley.
(c) United Brown Petroleum, Ltd.	232 Lougheed Bldg., Calgary	Turner Valley.
(c) United Oils, Ltd.	200 Leeson-Lineham Block, Calgary	Turner Valley.
Vanalta, Ltd.	Johnston Street, Granville, Vancouver, B.C.	Red Coulee.
(c) Vulcan-Brown Petroleum, Ltd.	232 Lougheed Bldg., Calgary	Turner Valley.
Wain-Con Oils, Ltd.	431 Tegler Bldg., Edmonton	Wainwright.
Wainwright Petroleum, Ltd.	Banque Canadienne Nationale, Edmonton	Wainwright.
Wayne Oils, Ltd.	Wayne	Turner Valley.
Westhank Oil Co., Ltd.	902 Lancaster Bldg., Calgary	Turner Valley.
Westside Royalties, Ltd.	232 Lougheed Bldg., Calgary	Turner Valley.
(c) West Turner Petroleum, Ltd.	703 Hall Bldg., Vancouver, B.C.	Turner Valley.
(c) Weymann Petroleum, Ltd.	500 Lancaster Bldg., Calgary	Pincher Creek.
Widney Oils, Ltd.	229 Eight Ave. W., Calgary	Turner Valley.
NORTHWEST TERRITORIES—		
Northwest Co., Ltd.	606 Second St. W., Calgary	Fort Norman.

(c) Drilling only.

(d) Operates an absorption plant.

(e) In addition to operating and drilling wells in the Turner Valley fields, this company operates two absorption plants.

OTHER NON-METAL MINING INDUSTRIES

DIRECTORY OF FIRMS—Continued

Asbestos Mining Industry

Name	Head office address	Location
QUEBEC—		
Asbestos Corporation, Ltd.....	Canada Cement Building, Montreal.....	Thetford Mines, Black Lake, Coleraine.
Bell Asbestos Mines, Ltd.	Thetford Mines.....	Thetford Tp.
Canadian Johns-Manville Co., Ltd.....	Sun Life Building, Montreal.....	Asbestos.
Granville, R. G. (a).....	625 Burnside Place, Montreal.....	Coleraine.
Johnson's Company.....	Thetford Mines.....	Thetford Mines, Coleraine.
La Cie d'Amiante de Thetford, Ltée. (a)....	Thetford Mines.....	Adstock.
Nicolet Asbestos Mines, Ltd.....	820 Transportation Bldg., Montreal.....	Norbestos.
Quebec Asbestos Corp., Ltd.....	East Broughton Station.....	East Broughton Sta.
Testaguzza, Angelo (contractor).....	Thetford Mines.....	Thetford Mines.
ONTARIO—		
Rahn Lake Mines Corp., Ltd.....	8½ Main St. W., North Bay.....	Bannockburn Tp., Matache-wan Dist.

(a) Carried on exploration only.

Bituminous Sands

ALBERTA—		
Abasand Oils, Ltd. (a).....	703/330 Bay St., Toronto, Ont.....	Athabaska River Dist.
International Bitumen Co., Ltd. (a).....	411 Williamson Bldg., Edmonton.....	Athabaska River Dist.
McMurray Asphaltum & Oil, Ltd.....	Petrolia, Ont.....	Athabaska River Dist.

(a) Active but not producing.

Diatomite

NOVA SCOTIA—		
International Diatomite Industries, Ltd.....	Tatamagouche.....	Little River, New Annan.
ONTARIO—		
Canadian Multi-Cell, Ltd.....	Martin's Siding.....	Martin's Siding.
Muskoka Diatomite, Ltd.....	Room 203/200 Bay St., Toronto.....	Gravenhurst.
Tynan, J., and Cox, H. R.....	Novar.....	Novar.
BRITISH COLUMBIA—		
Fairay and Company.....	661 Taylor St., Vancouver.....	Cariboo Dist.
Lepetich, P. G.....	Narcosli Creek P.O.....	Cariboo Dist.

Feldspar and Quartz Mining Industry

NOVA SCOTIA—		
(a) Nairn, J. S.....	Sydney (24 Whitney Ave.).....	Leitches Creek.
QUEBEC—		
Barr, W. J.....	Westmeath, Ont.....	Pontiac Co.
(a) (*) Brazeau, Maurice.....	Buckingham, Que.....	W. Portland Tp.
(a) (b) Canadian Carborundum Co., Ltd.....	Box 65, Niagara Falls, Ont.....	St. Canut.
(b) Canadian Flint & Spar Co., Ltd.....	Box 340, Buckingham.....	Derry Tp.
(a) (b) Canadian Koalin Silica Products, Ltd.	1007 Canada Cement Bldg., Montreal.....	St. Rémi d'Amherst.
Donaldson, Robert J.....	Glen Almond, Que.....	Buckingham Tp.
Evans, W. H.....	Box 386, Buckingham.....	Buckingham Dist.
(a) Hill, Nelson.....	Glen Almond, Que.....	Buckingham Tp.
Landry, J. N.....	Buckingham.....	Buckingham Dist.
Lavolette, A.....	Buckingham.....	Buckingham Dist.
Lavolette, Nathias.....	Buckingham.....	Buckingham Dist.
McDonnell, B. A.....	Buckingham.....	Derry Tp.
(a) (b) Montpetit Euclid.....	Melocheville.....	Beauharnois.
Murphy, Wm.....	Buckingham.....	Portland Tp.
(a) (b) Ottawa Silica & Sandstone, Ltd.....	East Templeton, Que.....	East Templeton.
Parcher, Alfred.....	Glen Almond.....	Derry Tp.
Pedneaud, G.....	Glen Almond.....	Glen Almond.
Perkins Mining Co.....	Gatineau Pointe, Que.....	Derry Tp.
St. Amour, Orphila.....	Notre Dame de la Salette.....	Papineau Co.
Sellers, W. & Parcher, Earl.....	Glen Almond.....	Derry Tp.

DIRECTORY OF FIRMS—Continued

Feldspar and Quartz Mining Industry—Concluded

Name	Head office address	Location
ONTARIO—		
Bathurst Feldspar Mines, Ltd.....	508/21 King St. E., Toronto.....	Bathurst Tp.
Cameron, Wallace B.....	Madawaska.....	Murchison Tp.
Charette, Sam.....	Estaire.....	Burwash Tp.
Craig, T. H.....	Perth.....	Bathurst Tp.
(a) (b) Dominion Mines & Quarries, Ltd.....	Canada Life Bldg., Toronto.....	Killarney.
(b) Frontenac Floor & Wall Tile Co., Ltd.....	Kingston.....	Kingston.
Gunters Mine.....	Prince's Lake.....	Sabine Tp.
Meeks, Leonard.....	Verona.....	Verona.
MacDonald, Pete.....	Hybla.....	Hybla.
Prince & Prince.....	Prince's Lake.....	Sabine Tp.
Raymond, F. & Sawyer, L.....	Madawaska.....	Jones Tp.
(a) Wright & Co.....	960 Queen St., Sault Ste. Marie.....	Deroche Tp.
MANITOBA—		
* Winnipeg River Tin Mines, Ltd.....	403 Avenue Bldg., Winnipeg.....	Pointe du Bois.

(a) Reported shipments of silica only.

(b) Operates a mill.

(*) Active but not producing.

NOTE.—In addition to the firms listed, there are Canadian metallurgical companies producing low grade silica sand for their own use.

Fluorspar

ONTARIO—		
Stoklosar, Chas. A.....	Box 198, Madoc.....	Madoc Tp.

Garnets

QUEBEC—		
(a) International Garnet Synd.....	Labelle.....	Joly Tp.
(a) (b) La Belle Mining Inc.....	4203 Breboeuf St., Montreal.....	Joly Tp.
ONTARIO—		
(a) Damigo Mining Synd., Ltd.....	Room 203, 34 King St. E., Toronto.....	Ashby Tp.

(a) Active but not producing.

(b) Acquired by Canada Garnet Co. in 1937.

Graphite

ONTARIO—		
Black Donald Graphite Co., Ltd.....	Calabogie.....	Brougham Tp.

Grindstones, Pulpstones and Scythestones

NOVA SCOTIA—		
Read Stone Co., Ltd.....	Sackville, N.B.....	Quarry Island (Pictou).
NEW BRUNSWICK—		
Read Stone Co., Ltd.....	Sackville.....	Stonehaven.
Smith, E. A.....	Shediac.....	Shediac.
BRITISH COLUMBIA—		
J. A. and C. H. McDonald, Ltd.....	1571 Main St., Vancouver.....	Gabriola and Haddington Islands and Vancouver.

DIRECTORY OF FIRMS—Continued

Gypsum Mining Industry

Name	Head office address	Location
NOVA SCOTIA—		
National Gypsum Co. (Can.), Ltd.....	192 Delaware Ave., Buffalo, N.Y., U.S.A...	Dingwall, Cheticamp and Walton.
Canadian Gypsum Co., Ltd.....	221 Bay St., Toronto, Ont.....	Wentworth.
The Connecticut Adamant Plaster Co.....	10 River St., New Haven, Conn., U.S.A.....	Cheverie.
(*) North American Gypsum Co.....	96 Curtis Ave., Rutland, Vt., U.S.A.....	Baddeck Bay.
Windsor Plaster Co., Ltd.....	Windsor.....	Brooklyn, Hants Co.
Victoria Gypsum Co., Ltd.....	Little Narrows.....	Little Narrows.
NEW BRUNSWICK—		
Canadian Gypsum Co., Ltd.....	1221 Bay St., Toronto, Ont.....	Hillsborough.
(*) Fraser, Donald.....	Plaster Rock.....	Plaster Rock.
ONTARIO—		
Canadian Gypsum Co., Ltd.....	1221 Bay St., Toronto, Ont.....	Hagersville.
Gypsum, Lime and Alabastine, Canada, Ltd.	Paris.....	Caledonia.
MANITOBA—		
Gypsum, Lime and Alabastine, Canada, Ltd.	Paris, Ontario.....	Gypsumville.
Western Gypsum Products, Ltd.....	503 McArthur Bldg., Winnipeg.....	Amaranth.
BRITISH COLUMBIA—		
Gypsum, Lime and Alabastine, Canada, Ltd.	Paris, Ontario.....	Falkland.
Summit Lime Works.....	Box 273, Lethbridge, Alberta.....	Fort Steele M.D.

(*) Did not ship in 1937.

Iron Oxides Mining Industry

QUEBEC—		
Argall, Thos. H.....	639 St. Angele St., Three Rivers.....	Pointe du Lac.
Girardin, Chas. D.....	Yamachiche.....	Alma.
(*) Iron Oxide Products Co., Ltd.....	680 Sherbrooke St. W., Montreal.....	Lacoste.
Sherwin-Williams Co. of Canada, Ltd.....	2875 Centre St., Montreal.....	Red Mill.
Vennes, Wm.....	Grand'Mère.....	St-Adelphe.
BRITISH COLUMBIA—		
Davidson, J. G.....	3498 Marine Drive, Vancouver.....	Rainbow Lodge.
(*) McDonald, R. W.....	128 Grizzly St., Banff, Alberta.....	Windermere Dist.

(*) Active, but no production.

Lithium Ore

MANITOBA—		
The Lithium Corp. of Canada, Ltd.....	403 Avenue Bldg., Winnipeg.....	Bernic Lake.

Magnesitic-Dolomite

QUEBEC—		
International Magnesite Co., Ltd.....	Calumet.....	Harrington Tp.
Canadian Refractories, Ltd.....	1050 Canada Cement Bldg., Montreal.....	Kilmar.
BRITISH COLUMBIA—		
(a) Consolidated Mining & Smelting Co. of Canada, Ltd.....	Trail.....	Marysville.

Magnesium Sulphate

BRITISH COLUMBIA—		
Epsom Refineries, Ltd.....	395 Main St., Winnipeg, Man.....	Ashcroft.

DIRECTORY OF FIRMS—Continued

Mica Mining Industry

Name	Head office address	Location
QUEBEC—		
Ahearn, W.	538 MacLaren St., Ottawa, Ont.	Hull Co.
(a) Blachford, H. L.	977 Aqueduc St., Montreal, P.Q.	Montreal.
(a) (b) Blackburn Bros., Ltd.	Blackburn Bldg., Ottawa, Ont.	Cantley and Templeton Tps.
(f) Blais, F. X.	Chateau Champlain, P.Q.	Wentworth Tp.
Cameron, Peter	Buckingham, P.Q.	Ottawa Tp.
(*) Chartier & Lanciault	\$262 Lajeunesse St., Montreal, P.Q.	Montcalm Co.
(*) Charlevoix Radium General Mining Co.	111 Côte de la Montagne, Quebec, P.Q.	Charlevoix-Saguenay Co.
Cheslock, Isidore	Poltimore, P.Q.	Poltimore.
(b) Cross, Walter C.	209 Bridge St., Hull, P.Q.	Hull.
De Rainville, Jos.	Wilsons Corners, P.Q.	Wilsons Corners.
Dechènes, Pierre	Wilsons Corners, P.Q.	Gatineau Dist.
(*) Duquette, W., & Lorrain, R.	Gatineau, P.Q.	Hull Co.
Eriksen, Erik J.	Alcove, P.Q.	Denholm.
(a) Gauthier, J. B.	Buckingham, P.Q.	Buckingham.
Kilfoyle, R. H.	Old Chelsea, P.Q.	Old Chelsea.
Laurel Mining Co., Ltd.	Edifice Ameau, Trois Rivières, P.Q.	Wentworth Tp.
(*) Laurentian Mica Mine & Products, Ltd.	1962 Galt Ave., Montreal, P.Q.	Labelle Co.
(b) Martin, A. G.	236 Besserer St., Ottawa, Ont.	Wilsons Corners.
McGarry, Edward	Wakefield, P.Q.	Wakefield.
(b) Mica Company of Canada, Ltd.	Hull, P.Q.	Hull.
Morris, J. and M.	Wilsons Corners, P.Q.	Wakefield Tp.
(a) O'Brien & Fowler, Ltd.	Box 340, Buckingham, P.Q.	Buckingham.
Perkins Mining Co.	Gatineau Pointe, P.Q.	Templeton Tp.
Routhier, Rev. Daniel	c/o Chas. Marlot, Low, P.Q.	Low.
Sergeant & Poirier Co.	Wilsons Corners, P.Q.	Wilsons Corners.
(*) St. Lawrence Mica Mines, Ltd.	105 Cote de la Montagne, Quebec, P.Q.	Montmorency.
Trudeau, Narcisse	Old Chelsea, P.Q.	Old Chelsea.
Trudeau W.	Old Chelsea, P.Q.	Old Chelsea.
(a) Toutloff, Frank	Gatineau Pointe, P.Q.	Gatineau Pointe.
Wallingford, Ed. B.	St. Pierre de Wakefield, P.Q.	N. Templeton Tp.
Wallingford, Ed.	Perkins, P.Q.	Gatineau Dist.
Wallingford, G. E.	63 Pinehurst Ave., Ottawa, Ont.	Gatineau Dist.
Wallingford, W. A., and J. N.	Perkins Mills, P.Q.	Templeton Tp.
(f) Williams, J. H., and Miller, L.	3427 Notre Dame St. W., Montreal, P.Q.	Argenteuil Co.
Winning, Bush	Buckingham, P.Q.	W. Portland Tp.
ONTARIO—		
Bennet, H. V.	Perth	N. Burgess Tp.
Jeffery, Arthur	Burks Falls	Ryerson Tp.
Haughian, Frank	Perth	Burgess Tp.
(a) Kent Bros.	114 Gore St., Kingston	Kingston.
Lee, W. W.	Bedford Mills	Bob's Lake.
Loughborough Mining Co., Ltd.	Sydenham	Sydenham.
(a) (b) Martin, A. G.	236 Besserer St., Ottawa	Ottawa.
Van Luven, A.	Portland	Eastern Ontario.
BRITISH COLUMBIA—		
Ray, P. M.	23 Besner Block, Prince Rupert	Baker Inlet.

- (*) Active but not producing.
(a) Dealer.
(b) Operates trimming plant.
(c) Operates grinding plant.
(f) Operated mine of Laurel Mining Co., Ltd.

Mineral Waters

QUEBEC—		
Abenakis Springs Co.	Blondin	Yamaska Co.
Eau Minérale Etoile	Ste. Geneviève de Batiscan	Ste. Geneviève de Batiscan.
Gurd, Chas., & Co., Ltd.	1016 Bleury St., Montreal	Varennes.
Laboratoire Mont-Clair	935 Robillard Ave., Montreal	Chambly Basin.
Lacerte, Adélard—Madame	St. Sévere	St. Sévere.
Bellemare, Josephat	St. Barnabé Nord	St. Maurice Co.
La Cie d'Eau Minérale	148 Concorde St., St. Hyacinthe	St. Hyacinthe.
La Cie d'Emboutillage St. Laurent	65 rue St. Pierre, St. Hyacinthe	St. Hyacinthe Co.
La Cie Embouteillage Idéal	3 St. Germain St., St. Hyacinthe	Abenakis.
L'Eau Naturelle Purgative de Chambord		
Ltée	Desbiens	Chambord.
Maski Bottling Works	St. Justin	Maskinongé Co.
Pellerin, Albert	St. Barnabé Nord	St. Barnabé Nord.
Radnor Mineral Water Springs	St. Maurice	Village Fermont.
Richard, Gerard	St. Grégoire	St. Grégoire.
Source, Coulombia	L'Epiphanie	L'Epiphanie.
Vandal, Donat	65 rue St. Pierre, St. Hyacinthe	St. Hyacinthe Co.
ONTARIO—		
Aqua Vitae Co., Ltd.	200 Albert St., Belleville	Hastings Co.
Boyd, T. Russell	Carlsbad Springs	Carlsbad Springs.
Denault, F.	Bourget	Bourget.
Gurd, Chas., & Co., Ltd.	1016 Bleury St., Montreal	Caledonia Springs.

DIRECTORY OF FIRMS—Continued

Nepheline-Syenite

Name	Head office address	Location
ONTARIO—		
(a) Canadian Nepheline, Ltd.....	714 Canada Permanent Bldg., Toronto, Ont.	Lakefield, Ont.
Gooderham Nepheline.....	24 Dickson St., Galt.....	Glamorgan Tp.
Golding-Keene Co.....	Keene, New Hampshire.....	Bancroft.
Morrison, Wm.....	64 Tyrrel Ave., Toronto.....	Eastern Ontario.

(a) Operates a mill in Canada.

Phosphate

QUEBEC—		
Blackburn Bros.....	Blackburn Bldg., Ottawa, Ont.....	Templeton.

Pyrites (Sulphur)

QUEBEC—		
(a) Aldermac Mines, Ltd.....	941 Dominion Square Bldg., Montreal.....	Rouyn Dist.
(a) Consolidated Copper and Sulphur Co., Ltd.....	Eustis.....	Eustis.
ONTARIO—		
(b) International Nickel Co. of Canada, Ltd..	Copper Cliff.....	Copper Cliff.
BRITISH COLUMBIA—		
(b) Consolidated Mining & Smelting Co. of Canada, Ltd.....	Trail.....	Trail.
(a) Britannia Mining & Smelting Co., Ltd.....	Britannia Beach.....	Britannia Beach.

(a) Produce by-product iron pyrites.
(b) Salvage sulphur from smelter gases.

Salt Industry

NOVA SCOTIA—		
Malagash Salt Co., Ltd.....	196 Provost St., New Glasgow.....	Malagash.
ONTARIO—		
Brunner, Mond Canada, Ltd.....	Canadian Bank of Commerce Bldg., Toronto.	Amherstburg.
Canadian Industries, Limited.....	P.O. Box 10, Montreal, P.Q.....	Windsor.
The Dominion Salt Co., Ltd.....	Sarnia.....	Sarnia.
Goderich Salt Co., Ltd.....	Goderich.....	Goderich.
Warwick Pure Salt Co., Ltd.....	R.R. 5, Watford.....	Lambton Co.
Western Canada Flour Mills Co., Ltd.....	287 MacPherson Ave., Toronto.....	Goderich.
MANITOBA—		
Neepawa Salt, Ltd.....	P.O. Box 10, Montreal, P.Q.....	Neepawa.
ALBERTA—		
Industrial Minerals, Ltd.....	Bank of Toronto Bldg., Edmonton.....	Waterways.

Silica Brick

NOVA SCOTIA—		
Dominion Steel and Coal Corp., Ltd.....	Sydney.....	Sydney.
ONTARIO—		
Algoma Steel Corp., Ltd.....	Sault Ste. Marie.....	Sault Ste. Marie.

Sodium Carbonate

BRITISH COLUMBIA—		
Davison, R. H.....	Chason, via 70 Mile House.....	Chason.

DIRECTORY OF FIRMS—Continued

Sodium Sulphate

Name	Head office address	Location
SASKATCHEWAN—		
Alexander, W. R.	Viscount.....	Berry Lake.
Dominion Sodium Refineries, Ltd.	513 Lougheed Bldg., Calgary, Alberta.....	Sask.
Horseshoe Lake Mining Co., Ltd.	Ormiston.....	Ormiston.
Midwest Chemicals, Ltd.	Palo.....	Whiteshore Lake.
(a) Muskiki Sulphates, Ltd.	Chinook, Alberta.....	Muskiki Lake.
Natural Sodium Products, Ltd.	Expanse.....	Frederick Lake.
(a) Oban Salt Co., Ltd.	Oban.....	Oban.
Sodium Corporation, Ltd.	c/o L. I. Hockley, Indian Head.....	Alsask.
ALBERTA—		
Bohannon, D. W.	Garfield.....	Oyen.

(a) Active but not producing.

Talc and Soapstone Industry

QUEBEC—		
Broughton Soapstone and Quarry Co., Ltd.	Broughton Station.....	Broughton Tp.
Cyr, L. R.	Lemesurier.....	Leeds Tp.
Fortin, Charles.....	Robertsonville.....	Thetford Tp.
Pharo, L. C.	Thetford Mines.....	Thetford Tp.
ONTARIO—		
Canada Talc, Ltd.	Madoc.....	Hastings Co.
(a) Gillespie, Geo. H., & Co., Ltd.	Box 232, Madoc.....	Madoc.
(a) Henderson Mines, Ltd.	Madoc.....	Madoc.
(*) Madoc Talc & Milling Co., Ltd.	Trenton.....	Cashel Tp.
BRITISH COLUMBIA—		
(*) Fairey and Company.....	661 Taylor St., Vancouver.....	Anderson Lake.
(b) Richmond, Geo. W.	2635 W. 15th Ave., Vancouver.....	

(*) No production reported in 1937.

(a) Absorbed by Canada Talc, Ltd.

(b) Milled only talc imported from the United States.

CLAY PRODUCTS AND OTHER STRUCTURAL MATERIALS

CLAY PRODUCTS INDUSTRY

DIRECTORY OF FIRMS—Continued

Brick, Tile, Clay and Sewer Pipe (from domestic clay)

Name	Head office address	Location
NOVA SCOTIA—		
(a) Brooks, Stephen, & Sons.....	Box 359, New Glasgow.....	New Glasgow.
(a) MacIntyre, A. D.....	11 Sheriff Ave., Sydney.....	Sydney.
Miller, James B.....	Elmsdale.....	Lantz Siding.
Shaw, L. E. Ltd.....	8 Prince St., Halifax.....	Lantz Siding.
Standard Clay Products, Ltd.....	St. Johns, P. Q.....	New Glasgow.
NEW BRUNSWICK—		
Little River Brick Co., Ltd.....	Little River, Saint John.....	Little River.
Ryan, M., & Son, Ltd.....	Fredericton.....	Fredericton.
Shaw, L. E., Ltd.....	8 Prince St., Halifax, N.S.....	Chipman.
Tondreau, Adelard.....	Bathurst.....	Bathurst.
QUEBEC—		
Ascot Tile & Brick Co., Ltd.....	Ascot Corner.....	Richmond Co.
Bégin, Olivier.....	R.R. 1, Petite Rivière.....	Petite Rivière.
Bourbeau, Geo., & Fils.....	R.R. 1, Danville.....	Kingsey Falls.
Canada China Clay, Ltd.....	85 Richmond St. W., Toronto, Ont.....	St. Rémi d'Amherst.
Champlain Brick, Ltd.....	56 rue de la Chapelle, Quebec.....	Beauport-Est.
Chicoutimi Brick Co., Ltd.....	Chicoutimi.....	Chicoutimi.
Citadel Brick, Ltd.....	14 St. Joseph St., Quebec.....	L'Islet Station, Boischatel.
Côté, Albert.....	Victoriaville.....	Victoriaville.
Crite, Freddy.....	St. Tite.....	St. Tite.
Desmarais, S. E., & Co.....	Richmond.....	Richmond.
Duquette, Isidore.....	Box 626, East Angus.....	Compton Co.
Gaulin, E.....	Princeville.....	Princeville.
Hodgins, David T.....	Box 114, Shawville.....	Clarendon Tp.
LaPrairie Co., Inc.....	660 St. Catherine St. W., Montreal.....	LaPrairie Co., Delson.
Lotbinière Brick Co.....	Deschailions.....	Deschailions.
Montreal Terra Cotta, Ltd.....	1010 St. Catherine St. W., Montreal.....	Lakeside.
Panet Brick Co., Ltd.....	L'Islet Station.....	L'Islet Station.
Potvin, Alphonse.....	Deschailions.....	Deschailions.
St. Lawrence Brick Co., Ltd.....	1010 St. Catherine St. W., Montreal.....	Laprairie.
Scott Brick Co.....	Scott Junction.....	Deschailions.
Standard Clay Products, Ltd.....	Box 189, St. Johns.....	Dorchester Co.
ONTARIO—		
Barnes, Wm. R., Company, Ltd.....	243 Cumberland Ave., Hamilton.....	Hamilton.
Belle River Brick & Tile Co.....	Belle River.....	Essex County.
Brampton Pressed Brick Co., Ltd.....	Brampton.....	Peel County.
Broadwell, B., & Son.....	Box 537, Kingsville.....	Essex County.
Canadian Pressed Brick Co., Ltd.....	Kenilworth Ave. S., Hamilton.....	Hamilton.
Casemore, R., & Son.....	Shallow Lake.....	Shallow Lake.
Chapman Bros.....	145 Dawes Road, Toronto.....	E. York Tp.
Construction Materials, Ltd.....	New Toronto.....	Etobicoke Tp.
Cooksville Co., Ltd.....	46 Bloor St. W., Toronto.....	Cooksville.
Coulitis, Geo., & Son.....	Thedford.....	Lambton Co.
Curtin, F., Estate.....	R.R. 4, Lindsay.....	Victoria Co.
Curtis Bros.....	Box 809, Peterborough.....	Otonabee Tp.
Deller, A., & Sons.....	R.R. 4, Brownsville.....	Oxford Co.
Deller Bros.....	R.R. 2, Norwich.....	Oxford Co.
Deller, Wm. H.....	R.R. 4, Thorndale.....	W. Nissouri Tp.
Dochard Brick, Tile & Terra Cotta Works.....	Annprior.....	Annprior.
Donaldson, Thos. Geo.....	R.R. 1, Greenock.....	Culross Tp.
Douglas & Douglas.....	Wilkesport.....	Lambton Co.
Dover Brick and Tile Works.....	Chatham.....	Dover Tp.
Elliott, Chas.....	Bluevale.....	Huron Co.
Elliott, Jas., Jr.....	Sault Ste. Marie.....	Korah Tp.
Elliott, Wm.....	Glenamman.....	Bruce Co.
Fletcher Brick and Tile.....	Fletcher.....	Kent Co.
Fort William Brick Co.....	Fort William.....	Fort William.
Frid Bros., Ltd.....	Main West and Macclim Sts., Hamilton.....	Hamilton.
Godfrey, Thos., & Co.....	Carleton Place.....	Laarak Co.
Gomall Brick & Tile Works.....	Fowassan.....	S. Himsworth Tp.
Grimsby Brick & Tile Co.....	Grimsby.....	Grimsby.
Hamilton Pressed Brick Co., Ltd.....	211 Kensington Ave. S., Hamilton.....	Wentworth Co.
Harper Brick Works.....	348 Greenwood Ave., Toronto.....	Toronto.
Hill, Aaron.....	Essex.....	Essex.
Hill, Albert W.....	R.R. 1, Coatsworth.....	Tilbury E. Tp.
Hitch, D. A.....	Box 236, Ridgetown.....	Howard Tp.
Hitch, Thos.....	Box 554, St. Thomas.....	St. Thomas.
Hodder, Mrs. J. H., & Sons.....	Dutton.....	Elgin Co.
Howlett, Fred W., & Sons, Ltd.....	Box 3, Petrolia.....	Petrolia, Brigden.
Huntsville Brick Works.....	Box 308, Huntsville.....	Muskoka.
Interprovincial Brick Co., Ltd.....	46 Bloor St. W., Toronto.....	Chinquacoucy Tp., Nassagaweya Tp.

DIRECTORY OF FIRMS—Continued

Brick, Tile, Clay and Sewer Pipe (from domestic clay)—Concluded

Name	Head office address	Location
ONTARIO—Concluded		
Jackson, W. B., Brick & Tile.....	Brantford.....	Brantford.
Jamieson Lime Co.....	Renfrew.....	Renfrew.
Janes, D. A.....	Mt. Brydges.....	Middlesex Co.

ADDENDA

The following should be read after "Ontario Brick and Tile Plant" (Government) page 319.

O'Reilly, T. E.....	320 Bay St., Ottawa.....	Carleton Co.
Ottawa Brick & Terra Cotta Co. Ltd.....	Billings Bridge.....	Carleton Co.
Ott Brick & Tile Mfg. Co. Ltd.....	Kitchener.....	Kitchener.
Owen Sound Brick Co. Ltd.....	Owen Sound.....	Owen Sound.
Paxton, Fred R.....	St. Catharines.....	St. Catharines.
Phinn, Geo. A.....	St. James Park, London.....	Middlesex Co.
Phippen & Son.....	Dawes Road, Box 11, Coleman.....	E. York Tp.
Richardson, J., & Son.....	Kerwood.....	Kerwood.
Rollins, D. W.....	136 Dundas St., Belleville.....	Thurlow Tp.
Snelgrove, A.....	Beaverton.....	Beaverton.
Sproat & Sproat.....	R. R. 4, Seaforth.....	Tuckersmith Tp.
Standard Brick Co.....	500 Greenwood Ave., Toronto.....	Toronto.
Superior Brick & Tile Co. Ltd.....	Fort William.....	Paipoonge Tp.
Thomson, Ralph.....	Henfryn.....	S. Grey Tp.
Tope Construction Co.....	Main St. W., Hamilton.....	Hamilton.
Toronto Brick Co. Ltd.....	897 Bay St., Toronto.....	Toronto, York Tp.
Wagstaff Brick & Tile Yard.....	R. R. 4, Lindsay.....	Victoria Co.
Wallace, M. J., & Son.....	Toronto General Trusts Corp., 253 Bay St., Toronto.....	Widdifield Tp.
Wein, Aaron.....	Crediton.....	Huron Co.
Weitzel, John E.....	R. R. No. 1, Tavistock.....	E. Zorra Tp.
Wright, Geo., & Sons.....	Comber.....	Comber.
MANITOBA—		
Alsip Brick, Tile & Lumber Co. Ltd.....	537 Portage Ave., Winnipeg.....	Winnipeg.
O'Day, J. E. (b).....	971 McMillan Ave., Winnipeg.....	Winnipeg.
Snyder Brick Yards Ltd.....	Portage La Prairie.....	Portage la Prairie.
Spencer, E. H.....	R. R. 1, Morden.....	Morden.
Wardrop, D. M.....	Whitemouth.....	Whitemouth.
Wollke, Peter (b).....	Morden.....	Morden.
SASKATCHEWAN—		
Alberta Clay Products Co. Ltd.....	Box 672, Medicine Hat, Alberta.....	Willows, Ravenscrag and Eastend.
Bruno Clay Works Ltd.....	Saskatoon.....	Bruno.
Dominion Fire Brick and Clay Products Ltd. (a).....	Box 99, Moose Jaw.....	Claybank.
International Clay Products Ltd.....	Box 399, Estevan.....	Estevan, Prince Albert.
Midland, H.....	Willow Bunch.....	Willow Bunch.
ALBERTA—		
Acme Brick Co. Ltd.....	125 Alberta Block, Edmonton.....	Cannell.
Alberta Clay Products Co. Ltd.....	Box 672, Medicine Hat.....	Medicine Hat, Dunmore.
Gunderson Brick & Coal Co. Ltd.....	Redcliff.....	Redcliff.
Johanson, Knut.....	Grande Prairie.....	Grande Prairie.
Little, J. B., & Sons Ltd.....	9120—100th Ave., Edmonton.....	Edmonton.
Medicine Hat Brick & Tile Co. Ltd.....	Medicine Hat.....	Medicine Hat..
Redcliff Pressed Brick Co. Ltd. (a).....	Redcliff.....	Redcliff.
Redcliff Premier Brick Co. Ltd.....	Redcliff.....	Redcliff.
Shaw-Walker Company, Ltd.....	Box 290, Station D, Montreal, P.Q.....	Exshaw.
BRITISH COLUMBIA—		
British Columbia Cement Co., Ltd.....	805 Government St., Victoria.....	Bamberton and Tod Inlet.
Coast Cement Co., Ltd.....	Granville Island, Vancouver.....	Granville Island.

(*) Idle in 1937.

DIRECTORY OF FIRMS—Continued

Lime Industry

Name	Head office address	Location
NOVA SCOTIA—		
(b) Dominion Steel & Coal Corp., Ltd.....	Sydney.....	Sydney.
(a) Eastern Lime Co., Ltd.....	Windsor.....	Windsor.
NEW BRUNSWICK—		
(a) Bathurst Power and Paper Co., Ltd.....	Bathurst.....	Bathurst.
(a) Purdy & Green, Ltd.....	323 Main St., Saint John.....	Saint John.
(a) (b) Randolph & Baker, Ltd.....	Randolph.....	Randolph.
(a) (b) Snowflake Lime, Ltd.....	3 Pokiok Road, Saint John.....	Saint John.
QUEBEC—		
Arnaud & Beaudry.....	Joliette.....	Joliette.
Boivin, Arthur.....	Pont Rouge.....	Pont Rouge.
Canada Lime & Stone, Ltd.....	St. Marc des Carrières.....	St. Marc des Carrières.
Carswell, Robt. B.....	Bryson.....	Bryson.
(a) Côté, Xavier.....	Métabetchouan.....	Métabetchouan.
Desfonds, Gaspard.....	St. Cuthbert.....	St. Cuthbert.
(a) Dominion Lime, Ltd.....	Lime Ridge.....	Lime Ridge.
Filion, Narcisse.....	St. Joachim.....	St. Joachim.
Gagné, Octave.....	St. Ulric.....	St. Ulric.
Héon and Héon.....	St. Louis de Champlain.....	St. Louis de Champlain.
Lalumière, Joseph.....	St. Dominique de Bagot.....	St. Dominique de Bagot.
(a) La Trappe de N. D. de Mistassini.....	Village des Pères.....	St. Eugène d'Argentenay.
(a) Limoges, Henri.....	552 Poupart St., Montreal.....	St. Michel.
(a) Mercure, C.....	9 rue St. Denis, St. Hyacinthe.....	St. Dominique de Bagot.
(a) National Stone & Lime Co.....	5181 rue Décelles, Montreal.....	St. Marc des Carrières.
(a) Shawinigan Chemicals, Ltd.....	107 Craig St., Montreal.....	Shawinigan Falls.
(a) Standard Lime Co., Ltd.....	Joliette.....	St. Paul de Joliette, St. Marc des Carrières.
(a) St. Michel Lime Co.....	Ville St. Michel.....	Ville St. Michel.
Trottier, David.....	St. Marc des Carrières.....	St. Marc des Carrières.
(a) Villeneuve, R.....	St. Jérôme.....	St. Jérôme.
ONTARIO—		
Bell, Harry.....	R.R. 4, Chesley.....	Grey County.
(b) Brown's Lime Works.....	Owen Sound.....	Owen Sound.
(a) Brunner, Mond Canada, Limited.....	Canadian Bank of Commerce Bldg., Toronto.....	Amherstburg Dist.
(a) Cameron, W. M.....	Carleton Place.....	Carleton Place.
(a) Canada and Dominion Sugar Co., Ltd.....	Chatham.....	Chatham, Wallaceburg.
(a) Canada Lime Co.....	Coboconk.....	Victoria Co.
Canadian Gypsum Co., Ltd.....	1221 Bay St., Toronto.....	Guelph.
(b) Chalmers Lime Works.....	Owen Sound.....	Owen Sound.
(a) Dominion Rock Products, Ltd.....	941 Dominion Square Bldg., Montreal, P.Q.....	Eganville.
(a) Electro Metallurgical Company of Canada, Limited.....	Canada Life Building, Toronto.....	Welland.
(a) (b) Gypsum, Lime & Alabastine, Canada, Ltd.....	Paris.....	Beachville, Hespeler, Milton.
(a) Innerkip Lime & Stone Co., Ltd.....	Beachville.....	Beachville.
(a) Jamieson Lime Co.....	Renfrew.....	Renfrew County.
(a) North American Cyanamid, Ltd.....	1908 Royal Bank Bldg., Toronto.....	Niagara Falls.
(b) Rockwood Lime Co.....	Box 46, Rockwood.....	Rockwood.
(a) Shane Lime and Charcoal Co., Ltd.....	Eganville.....	Fourth Chute.
MANITOBA—		
(a) (b) Gillis Quarries, Ltd.....	Richard and Spruce Sts., Winnipeg.....	Garson, Poplarfield.
(a) (b) Gypsum, Lime & Alabastine, Canada, Ltd.....	Paris, Ontario.....	Winnipeg.
(a) (b) Winnipeg Supply & Fuel Co., Ltd.....	812 Boyd Bldg., Winnipeg.....	Spearhill, Stonewall.
ALBERTA—		
(a) Canadian Sugar Factories, Ltd.....	Raymond.....	Raymond.
Loders Lime Co., Ltd.....	Kananaskis.....	Kananaskis.
(a) Summit Lime Works.....	Box 273, Lethbridge.....	Lethbridge Dist.
BRITISH COLUMBIA—		
(*) Lyon, F.....	Hedley.....	Hedley.
(a) Pacific Lime Co., Ltd.....	744 West Hastings St., Vancouver.....	Texada Island.
(a) Pacific Mills, Ltd.....	Raymur Ave., Vancouver.....	Ocean Falls.

(*) Operator for Kelowna Exploration Co., Ltd.

(a) Use calcium or high calcium limestone.

(b) Use dolomite or dolomitic limestone.

Sand-Lime Brick Industry

Names of companies	Location of plant
Standard Lime Company, Limited.....	1595 St. Gregoire St., Montreal, P.Q.
Harbour Brick Company, Limited.....	Fleet & Bathurst Sts., Toronto, Ont.
Hinde Bros.....	Mount Dennis, Ont.
Toronto Brick Company, Ltd.....	Victoria Park Ave., Toronto, Ont.
York Sandstone Brick Company, Ltd.....	447 Victoria Park Ave., Toronto, Ont.

DIRECTORY OF FIRMS—Continued

Principal Sand and Gravel Operators

In addition to the names listed below, production has been reported by the railway companies for ballast, and also a considerable amount by counties and townships in Ontario for road use.

Name	Head office address	Location
NOVA SCOTIA—		
McSween, A. H.....	Ironville.....	Ironville.
Mosher, Walter.....	307 Portland St., Dartmouth.....	Elmsdale.
Nova Scotia Department of Highways.....	Halifax.....	Various.
Walker, A. G.....	Bridgetown.....	Near Bridgetown.
NEW BRUNSWICK—		
Anderson, A. W.....	Fairville.....	Fairville.
Fundy Fur and Feather Farm.....	Little River.....	Little River.
Likely, Jos. A., Ltd.....	Saint John.....	East Saint John.
Maxwell, Chas.....	St. Stephen.....	St. Stephen.
New Brunswick Department of Highways.....	Fredericton.....	Various.
QUEBEC—		
Alcoa Power Co., Ltd.....	Chute à Caron P.O. Racine.....	Racine.
Barbe, Alfred.....	Ste. Rose Ouest.....	Ste. Rose Ouest.
Bedard, Paul H., Ltée.....	85 Ave. Cartier, Quebec.....	St. Emile.
Belmont Construction Co., Ltd.....	679 Belmont St., Montreal.....	Pontiac.
Bigras, Honore.....	St. Vincent de Paul.....	Laval Co.
Bigras, Omer.....	Ste-Rose Ouest.....	Ste-Rose Ouest.
Bonner Sand & Ballast, Ltd.....	1434 St. Catherine St. W., Montreal.....	South Durham, Abbotsford.
Brouillet Sand & Gravel.....	Rawdon.....	St. Julienne.
Canadian Johns-Manville Co., Ltd.....	Sun Life Bldg., Montreal.....	Asbestos.
Coaticook, Ville de.....	100 Child St., Coaticook.....	Coaticook.
Cie de Sable, Ltée., La.....	10 Third Ave., Quebec.....	St. Charles River.
Consolidated Oka Sand & Gravel Co., Ltd.....	248 McCord St., Montreal.....	Lake of Two Mountains.
Dutrisac, Noel.....	Ste-Rose.....	Ste-Rose.
Granby, City of.....	Granby.....	Granby.
Grandmaitre, Donat.....	19 Olmstead Nord, Eastview.....	Hull.
Latulippe, Philippe & Amédée.....	238 rue de la Ronde, Quebec.....	St. Charles River.
Local Construction Co. Ltd.....	4740 Ierville St., Montreal.....	Berthier, Louiseville, Mas- kinonge, Pointe-du-Lac, Yamachiche.
Corp. de la ville de Magog, La.....	Magog.....	Magog.
Marchand, Euclide.....	Almaville-en-Haut.....	Almaville-en-Haut.
Massicotte & Trudel.....	Senneterre.....	Senneterre.
Mercur, Camille.....	9 rue St. Denis, St. Hyacinthe.....	St. Dominique.
Nationale de Pav. & Construction Ltée., La Cie.....	934 St. Catherine St., Montreal.....	Cte. Pipeineauville.
National Sand & Material Co., Ltd.....	402 Harbour Bldg., Toronto, Ont.....	Montreal.
O'Connell, H. J., Ltd.....	509 Canada Cement Bldg., Montreal.....	Deschambault, Portneuf and St. Marc.
Ontario Paper Co., Ltd.....	485 McGill St., Montreal.....	Baie Comeau.
Paradis & Farley Inc.....	2775 Willowdale Ave., Montreal.....	
Perron, J. E.....	129 Jacques Cartier St., Chicoutimi.....	Chicoutimi.
Piedmont Construction Co., Ltd.....	832 St. James St. W., Montreal.....	Ste-Therese.
Quebec Department of Highways.....	Quebec.....	Various.
St. Francis River Dredging Co.....	St-François du Lac.....	Rivière St. François.
Sherbrooke, City of.....	Sherbrooke.....	Sherbrooke.
Sorel Harbour Tugs, Ltd.....	St. Joseph de Sorel.....	St. Francis River.
Standard Lime Co., Ltd.....	Joliette.....	Ste-Emilie.
Standard Sand & Gravel, Ltd.....	St. Felix de Valois.....	Joliette Co.
ONTARIO—		
Axford, J. B., & Sons.....	35 Elm St., St. Thomas.....	South Yarmouth.
Barnes, Wm. R., Co. Ltd.....	243 Cumberland Ave., Hamilton.....	Springvale, Waterdown, Hamilton, Nixon.
Bellyou, N. E.....	R.R. 4, Trenton.....	Northumberland Co.
Birch, Jas. A.....	Richmond.....	Nepean Tp.
Boyd Bros.....	Osgoode.....	Osgoode Tp.
Braas Bros. Hillcrest Sand Co.....	R.R. 3, Niagara Falls.....	Stamford.
Bradt, E. S.....	R.R. 5, Cayuga.....	Haldimand.
Brantford, City of.....	Brantford.....	Brantford.
Butler, M. J.....	R.R. 2, Bayfield.....	Goderich Tp.
Cameron, Chas. M.....	R.R. 1, Glencoe.....	Mosa Ty.
Campbellford, Town of.....	Box 497, Campbellford.....	Campbellford.
Canadian Aggregates, Ltd.....	1958 Wyandotte St., Walkerville.....	Burford Tp.
Connell Bros.....	Clinton.....	Clinton.
Consolidated Sand & Gravel, Ltd.....	402 Harbour Building, Toronto.....	Durham, Fuller, Paris, Waterford.
Cudmore, Mrs. Alice.....	Hensall.....	Usborne Tp.
Cudmore, Bertha.....	R.R. 6, Thamesville.....	Howard Tp.
Curran & Briggs, Ltd.....	203 Manning Chambers, Toronto.....	Bobcaygeon, Brockville, Dunsford, Echo Bay and Haliburton.
Cuthbert, C. E.....	Curries.....	Curries.
Dominion Concrete Co., Ltd.....	Kemptville.....	Gravel Co.
Dominion Mines & Quarries, Ltd.....	340 University Ave., Toronto.....	Killarney.
Donald, Andrew.....	R.R. 1, Ingersoll.....	Durham Tp.
Erb, John.....	R.R. 2, Zurich.....	Near Zurich.

DIRECTORY OF FIRMS—Continued

Principal Sand and Gravel Operators—Continued

Name	Head office address	Location
ONTARIO—Continued		
Ferguson, Richard W.	72 Pearl St. W., Brockville	Gananoque.
Forrester, Wm. E.	Morewood.	Winchester Tp.
Foster, R.R., & Sons, Ltd.	86 Spadina Ave., Ottawa	Near Ottawa.
Frid Bros., Ltd.	Main W. and Macklin Sts., Hamilton	Hamilton.
Grace Builders Supplies.	291 S. Christina St., Sarnia	Lake Huron Beach.
Grandmaitre, D.	19 Olmstead St. N., Eastview	Rockcliffe Village.
Hadleys Chatham, Ltd.	Box 280, Chatham	Thames River.
Hollinger Cons. Gold Mines, Ltd.	Timmins	Tisdale Tp.
Howard Sand & Gravel Co., Ltd.	Aldershot	E. Plamboro Tp.
Hydro Electric Power Commission.	620 University Ave., Toronto	Cochrane and Hudson Bay Districts.
Johnston, G. F.	R.R. 2, Wilton Grove	Westminster Tp.
Jupp, A. E., Construction Co., Ltd.	170 Berkeley St., Toronto	Mara Tp.
Kilbourne, H., & Son.	145½ Wharfedale Rd. S., London	London.
MacEwen, John L.	Bluevale	Turnberry Tp.
Machan, Andrew	West Monkton	Grey Tp.
McLean, A. B., & Sons	Sault Ste. Marie	Lake Superior.
McLeish Estate	Parkhill	Parkhill.
McNamara Construction Co., Ltd.	12 Industrial St., Leaside	Lake Simcoe.
McQuillan, Wm. F.	R. R. 1, Lucknow	W. Wawanosh Tp.
National Sand and Material Co., Ltd.	402 Harbour Commission Bldg., Toronto	Great Lakes.
Nevill, George	R.R. 5, Aylmer	Malahide Tp.
Newell, Herbert	R.R. 4, Aylmer	Malahide Tp.
Ontario Department of Highways	Toronto	Various.
Ontario Department of Northern Development	Toronto	Various.
Page, Jacob	Fenwick	Fenwick.
Quigleys	Bartonville	Waterdown.
Rayner Construction, Ltd.	29 Commercial St., Leaside	Bracebridge, Geraldton and Powassan.
Sarjeant Co., Ltd., The	49 Dunlop St., Barrie	Barrie.
Spratt, J. H.	Billings Bridge	Gloucester Tp.
Sterling Gravel & Supplies, Ltd.	2494 Sandwich St. E., Windsor	Lake Erie.
Stewart, Fenwick	R.R. 5, Clinton	Stanley Tp.
Stover, Elmer	R.R. 4, Tillsonburg	Middleton Tp.
Tees Transit Co.	77 Sterling St., Hamilton	Simcoe Island.
Thompson, H. J.	R. R. 2, Clinton	Goderich Tp.
Towland Construction Co., Ltd.	294 Dundas St., London	London, Saugeen and Wawanosh Tps.
United Towing and Salvage Co., Ltd.	635 Common St., Montreal	Lake Superior.
Vallery, H. J.	3 Beaty Ave., Toronto	Belwood.
Wallaceburg Sand & Gravel Co.	Wallaceburg	Stag Island.
White, Homer, & Co.	Pictou	Hallowell Tp.
White, Rachel, Miss.	R.R. 7, London	Middlesex Co.
Wilcox, Hervey	985 Bridge St., Niagara Falls	Stamford Tp.
Woolatt Fuel & Supply Co., Ltd.	2171 Ottawa St., Walkerville	Gosfield S. Tp.
Workman, J. J.	R.R. 1, Drumbo	Blenheim Tp.
Wright & Co.	960 Queen St., Sault Ste. Marie	Mill 5, A.C.R.
Wylie, Greer	R.R. 1, Wingham	Turnberry Tp.
Yundt, Wm.	187 Cobourg St., Stratford	Ellice Tp.
MANITOBA—		
Brandon, City of	Brandon	Brandon.
Building Products & Coal Co., Ltd.	Christie St., Winnipeg	Birds Hill.
Cumming & Dobbie.	233, 9th St., Brandon	Brandon.
Cusson, J. A.	St. Boniface	Ste. Anne.
Dominion Mines and Resources Department	Ottawa, Ontario	Riding Mt., National Park.
Elander, John	Flin Flon	Flin Flon.
Greater Winnipeg Water District	185 King St., Winnipeg	Mill 31 and Mill 80, G.W.W. D.R.
Jackson, Thos., & Sons, Ltd.	370 Colony St., Winnipeg	Ste-Anne.
Manitoba Department of Highways	Winnipeg	Various.
McCurdy Supply Co., Ltd.	1034 Arlington St., Winnipeg	Various.
Provincial Gravel and Coal Co., Ltd.	704 Great West Permanent Bldg., Winnipeg	Lockport.
Riley, W. J.	Molson	Molson.
Rosser, Municipality of	Rosser	Rosser.
Winnipeg Hydro Electric System.	55/59 Princess St., Winnipeg	Sec. 31, Tp. 15, R 14.
SASKATCHEWAN—		
Betteridge, Stanley	Pilot Butte	Pilot Butte.
Dominion Mines and Resources Department	Ottawa, Ont.	Prince Albert, National Park.
Gauthier, G.	22 Hill St., Flin Flon, Man.	Near Flin Flon, Man.
Hudson Bay Mining & Smelting Co., Ltd.	Flin Flon, Man.	Near Flin Flon, Man.
North Battleford, City of	1201 King St., North Battleford	North Battleford.
Salvador, Village of	Salvador	Salvador.
Saskatchewan Dept. of Highways	Regina	Various.
Yorkton, City of	Yorkton	Yorkton.
ALBERTA—		
Alberta Department of Highways	Edmonton	Various.
Cristall Sand	10165, 104th St., Edmonton	Perryvale.
Dominion Mines and Resources Department	Ottawa, Ont.	National Parks.
Jefferies & Sons, Ltd.	1135 Tenth St. E., Calgary	Calgary.
Nanton, Town of	Nanton	Nanton.
Sutherland, M.	Box 307, Olds	Westerdale Municipality.

DIRECTORY OF FIRMS—Continued

Principal Sand and Gravel Operators—Concluded

Name	Head office address	Location
BRITISH COLUMBIA—		
Armstrong, City of.....	Armstrong.....	Vernon M.D.
B. C. Department of Highways.....	Victoria.....	Various.
B. C. Sand & Gravel Co., Ltd.....	2235 West 10th Avenue, Vancouver.....	Lynn timer.
Burnaby, Corp. of the District.....	Edmonds, New Westminster.....	Burnaby.
Cascade Rock & Gravel Co., Ltd.....	Lynn timer.....	Lynn timer.
Chilliwack, City of.....	Chilliwack.....	Chilliwack.
Consolidated Mining and Smelting Co. of Canada, Ltd.....	Trail.....	Trail.
Cranbrook, City of.....	Cranbrook.....	Cranbrook.
Deeks Sand & Gravel Co., Ltd.....	101 W. 1st Avenue, Vancouver.....	N. Vancouver and Coquitlam.
Dominion Mines and Resources Department.....	Ottawa, Ontario.....	National Parks.
Freshwater Sand & Gravel Co., Ltd.....	Foot Columbia Ave., Vancouver.....	Port Coquitlam.
Hillside Sand & Gravel.....	1075 Main St., Vancouver.....	Hillside, Howe Sound.
Kamloops, City of.....	Kamloops.....	Kamloops.
National Parks Highways.....	Ottawa, Ontario.....	National Parks.
Nelson, City of.....	Nelson.....	Nelson.
Port Alberni, City of.....	Port Alberni.....	Port Alberni.
Port Coquitlam, City of.....	Port Coquitlam.....	Port Coquitlam.
Prince Rupert, City of.....	Prince Rupert.....	Prince Rupert.
Producers Sand & Gravel Co. (1929), Ltd.....	1902 Store St., Victoria.....	Royal Bay.
Trail, City of.....	Trail.....	Near Trail.

Stone Quarrying Industry

Granite

NOVA SCOTIA—		
(*) Dauphinee, W. T.....	Shelburne.....	Shelburne.
(*) Nixon, W. H.....	R.R. 3, Middleton.....	Nictaux West..
Nova Scotia Dept. of Highways.....	Halifax.....	Various.
(*) Rice Bros.....	Lawrencetown.....	Nictaux West.
(*) Rice, W. D.....	Middleton.....	Nictaux West.
(*) Shelburne Marble & Granite Works.....	Shelburne.....	Birchtown.
NEW BRUNSWICK—		
(*) Granite St. Paving & Con. Co., Ltd.....	Rothsay Ave., Saint John.....	Hampstead.
(*) Milne Coutts & Co., Ltd.....	St. George.....	St. George.
(*) B. Mooney & Sons Realty, Ltd.....	Box 727, Saint John.....	Hampstead.
(*) O'Brien & Baldwin.....	St. George.....	St. George.
QUEBEC—		
Alcoa Power Co., Ltd.....	Chute à Caron.....	Chicoutimi Co.
B. & R. Granite Quarry.....	Beebe.....	Ogden Twp.
(*) Bernier & Fils.....	Box 491, Roberval.....	Roberval.
(*) Berubé, Lucien.....	Brownburg.....	Chatham Twp.
(*) Brodie's, Ltd.....	1070 Bleury St., Montreal.....	Mt. Johnson, Guenette, Graniteville.
Brunet, Jos.....	4411 Chemin Côte des Neiges, Montreal.....	Montreal.
Bullock, Wright.....	Graniteville.....	Ogden Twp.
(*) Bussière, A. L.....	St. Sébastien.....	St. Cécile.
Chicoutimi, City of.....	Chicoutimi.....	St. Paul Twp.
(*) Cloutier, R. L.....	Beebe.....	Beebe.
Delwaide & Goffin.....	Chicoutimi.....	Chicoutimi.
Derosiers, Albert.....	Beebe.....	Stanstead Twp.
(*) Deschambault Quarry Corp.....	56 Rue St. Pierre, Quebec.....	St. Gérard de Wolfe.
Descoleaux, Jos.....	La Tuque.....	La Tuque.
Didier, Jos. Belley.....	Jonquière.....	Jonquière.
Dontigny, Alphonse.....	Glenada.....	St. Flore.
(*) Drummond Quarry, Ltd.....	Drummondville.....	Drummondville.
(*) Dubois, Honore.....	Rivière à Pierre.....	Colbert Twp.
Dumas, Auguste.....	Rivière à Pierre.....	Bois Twp.
Emslie and Denny.....	Beebe.....	Beebe.
Ferland and Fortin.....	Metabetchouan.....	Metabetchouan.
Foundation Co. of Can., Ltd.....	485 McGill St., Montreal.....	Saguenay Co.
(*) Gagnon, Arthur.....	76 Rue St. Louis, Grand'Mère.....	Grand'Mère.
Gaillardets & Dupont.....	Shawinigan Falls.....	Shawinigan.
Gauthier, Jos., Jr.....	81 rue Taché, Chicoutimi.....	Arvida.
(*) Gingras et Frère, Ltée.....	St. Marc des Carrières.....	Stanhope.
Gosselin, Oscar.....	Lac Mégantic.....	St. Samuel.
(*) Granit National Ltée., Le.....	St. Joseph d'Alma.....	Lac St. Jean Co.
Granit Rouge de St. Canut Engr.....	757 Mont Royal Est, Montreal.....	St. Canut.
Grenier, Elie.....	Glenada.....	Glenada.
Haselton, W. M.....	Beebe.....	Stanstead Co.
Henrickson and Hokanson.....	R.R. 1, Beebe.....	Granitville.
(*) Inter-Provincial Construction, Limited.....	Rigaud.....	Rigaud.
Jonquière, Ville de.....	Jonquière.....	Jonquière.

NOTE.—(*) Firms operating dressing works in conjunction with quarry.

DIRECTORY OF FIRMS—Continued

Granite—Concluded

Name	Head office address	Location
QUEBEC—Concluded		
Lacasse & Boulais.....	Box 23, Beebe.....	Beebe.
Langevin, H. & J. C. Coté.....	Chicoutimi.....	Chicoutimi.
Laroche, Omer.....	Rivière à Pierre.....	Rivière à Pierre.
Maltais, Charles.....	St. Joseph D'Alma.....	St. Joseph D'Alma.
McIntosh, Robert.....	Quebec.....	Ogden Twp.
Quebec Dept. of Highways.....	Quebec.....	Various.
Port Alfred, Town of.....	Port Alfred.....	Port Alfred.
Riverin and Riverin.....	Chicoutimi.....	Chicoutimi.
St. Bruno Quarry & Paving Co., Ltd.....	636 Ave. Querbes, Outremont.....	Chambly Co.
St. Jérôme, Ville de.....	St. Jérôme.....	St. Jérôme.
(*) Silver Granite Co., Ltd.....	180 Côte d'Abraham, Quebec.....	Rivière-à-Pierre, St. Samuel Station.
(*) Stanstead Granite Quarries Co., Ltd.....	Beebe.....	Graniteville.
Trudel, Nap.....	St. Irénée.....	St. Irénée.
Voyer, F. & Frère.....	Rivière-à-Pierre.....	Rivière-à-Pierre.
(*) Wilkinson, Frank L.....	Beebe.....	Stanstead Co.
ONTARIO—		
(*) Building Products, Ltd.....	Box 2529 Montreal, Que.....	Verona, Mountain Grove.
Canadian Dredge & Dock Co., Ltd.....	Midland.....	Port Arthur, Harbour.
Canadian Nepheline Syenite.....	Canada Permanent Bldg., Toronto.....	Lakefield.
Fort William, City of.....	Fort William.....	Mt. McKay.
Grenville Crushed Rock Co., Ltd.....	917 Keefer Bldg., Montreal.....	Hawk Lake.
Gummeson Quarry.....	Butler.....	Butler.
(*) Hall, R. R.....	Parry Sound.....	Parry Sound.
Hewitson Construction Co.....	Port Arthur.....	McIntyre Twp.
(*) Horne, Wm.....	Butler via Ignace.....	Butler.
Hydro Electric Power Commission.....	620 University Ave., Toronto.....	Patricia Dist., Cochrane Dist.
Ontario Rock Co., Ltd.....	320 Bay St., Toronto.....	Belmont Twp.
MANITOBA—		
(*) Winnetoba Marble Co., Ltd.....	1180 Wall St., Winnipeg.....	Hawk Lake and Hodgson.
BRITISH COLUMBIA—		
(*) B. C. Monumental Works, Ltd.....	27 Kingsway, Vancouver.....	Granite Island.
Canadian National Railways.....	Montreal, Que.....	Various.
Canadian Pacific Railways.....	Montreal, Que.....	Various.
Coast Quarries, Ltd.....	1840 Georgia St. W., Vancouver.....	Granite Falls.
Cons. Mining & Smelting Co. of Canada, Ltd.....	Trail.....	Portland Canal M.D.
Gilley Bros., Ltd.....	902 Columbia St. W.....	New Westminster.
Huchcroft Quarries.....	Box 54, Cranbrook.....	Cranbrook.
(*) Nelson Granite & Monumental Co.....	505 Front St., Nelson.....	Nelson.
Port Alberni, City of.....	Port Alberni.....	Alberni.
Prince Rupert, City of.....	Prince Rupert.....	Prince Rupert.
(*) Vancouver Granite Co., Ltd.....	932 Marine Bldg., Vancouver.....	Nelson Island.
(*) Vernon Granite & Marble Co.....	Okanagan Landing.....	Yale Dist.
(*) Wilson, James S.....	Sirdar.....	Sirdar.

Limestone

NOVA SCOTIA—		
Eastern Lime Co., Ltd.....	Windsor.....	Windsor.
Kirkpatrick, Robie.....	Kirkhill.....	Kirkhill.
McLean, Peter.....	Nappan.....	Nappan.
McVicar & McDonald.....	Bailey's Brook.....	Bailey's Brook, Lime Rock.
Mersey Paper Co., Ltd.....	Liverpool.....	East River.
Mosher, O. P.....	Musquodoboit Harbour.....	Musquodoboit Hbr.
North Inverness Lime Crushing Assoc.....	Cheticamp.....	River Dennis and Judique.
N. S. Dept. of Agriculture.....	Truro.....	Various.
Nova Scotia Dept. of Highways.....	Halifax.....	Various.
NEW BRUNSWICK—		
Clark, J. Sutton.....	L'Etang.....	L'Etang.
Gilbert, Geo.....	Bathurst.....	Bathurst.
Randolph & Baker.....	Randolph.....	Randolph.
Snowflake Lime, Ltd.....	Saint John.....	Saint John.
QUEBEC—		
Andorno, J. E.....	Cap St. Martin.....	Cap St. Martin.
Babien, Emilien.....	Rivière Caplan.....	Rivière Caplan.
Beaudry, J. Piro.....	41 rue Taché, Joliette.....	Bldv. Querbes.
Blais, Jos.....	Levis.....	Levis.
Boily, Albert.....	Baie St. Paul.....	Charlevoix Co.
Boivin, Ladislav.....	Baie St. Paul.....	Baie St. Paul.
Bourque, A.....	St. Marc des Carrières.....	St. Marc des Carrières.
Canada Cement Co., Ltd.....	Phillips Square, Montreal.....	Hull and Montreal East.
Canadian Quarries, Ltd.....	4740 rue Iberville, Montreal.....	Montreal.
Carrière du Cap Martin, Eng.....	636 Querbes, Outremont.....	Cap St. Martin.
Carrière Gravel, Ltd.....	Chateau Richer.....	Chateau Richer.
(*) Carrière Maril, Ltd.....	St. Michel Station.....	Chateauguy.

NOTE.—(*) Firms operating dressing works in conjunction with quarry.

DIRECTORY OF FIRMS—Continued

Limestone—Continued

Name	Head office address	Location
QUEBEC—Concluded		
Carrière de St. Barthélemi, Ltd.	St. Barthélemi.	St. Barthélemi.
Carrières St. Marc, Ltd.	St. Marc des Carrières.	St. Marc des Carrières.
Carrière Chateau.	Chateau Richer.	Chateau Richer.
Carrière St. Maurice, Ltd.	307 rue Alexandre, Trois Rivières.	Champlain Co.
(*) Cercle Agricole	St. Godfroy.	St. Godfroy.
(*) Charbon, Arthur	Belanger.	Laval Co.
(*) Charbonneau Lucien & Cie.	St. Francois de Sales.	Laval Co.
Charbonneau, G.	8013 St. Denis St., Montreal.	Montreal.
Chauffage & Ventilation, Ltée.	105 Côte de la Montagne, Quebec.	Val Brilliant.
Chenel, Rev. J. E.	Port Daniel East.	Port Daniel E.
(*) Dept. of Justice	Ottawa.	St. Vincent de Paul.
(*) Deschambault Quarry Corp.	56 Rue S. Pierre, Quebec.	St. Marc des Carrières.
Desilets, J. A.	St. Louis de Champlain.	St. Louis de Champlain.
(*) Dominion Lime, Ltd.	East Angus.	Lime Ridge.
Drouin, Madame Eva Cimon.	St. Justine.	St. Justine.
Dubé, Philippe	St. Clement.	St. Paul de la Croix.
Durocher, Cyrille.	11021 Notre Dame E., Montreal E.	Montreal E.
(*) Faubert, Alphonse.	De Jéry.	Chateaugay Co.
Fortin, Georges.	St. Honoré de Chicoutimi.	Chicoutimi.
Francoeur, J. B.	St. Godfroy.	St. Godfroy.
Fuger and Smith, Ltd.	Pointe Claire.	Pointe Claire.
Gagné, Octave.	St. Ulric.	Matane Co.
Gagné, Eugène	Métabetchouan.	Métabetchouan.
Gagnon, Auguste	St. Godfroy.	St. Godfroy.
Gaspesian Fertilizer Co.	Port Daniel E.	Port Daniel E.
(*) Gauthier, Olivier.	St. Marc des Carrières.	St. Marc des Carrières.
Gauthier, René.	Village Bélanger.	Laval Co.
(*) Gingras et Frère, Ltée.	St. Marc des Carrières.	St. Marc des Carrières.
Guillemette, André.	St. Marc des Carrières.	St. Marc des Carrières.
Harrison, Georges et Cie.	Poncheville.	Matane Co.
Kennedy Construction Co., Ltd.	407 McGill St., Montreal.	Actonvale.
Laberge and Marchand.	Chateaugay.	Chateaugay.
Lagace, Nap.	L'Abord-à-Plouffe.	St. Martin.
Lakeshore Construction Co.	Pointe Claire.	Pointe Claire.
Landry, Seguin & Benoit.	Richelieu.	Richelieu.
La Carrière Marcl, Ltd.	St. Michel Station.	St. Michel Station.
Lacroix & Gagnon.	St. Joachim.	St. Joachim.
(*) Lapointe, A. & E.	12034 Lachapelle, Montreal.	Cartierville.
Lapointe, Emile.	St. Dominique, Bagot.	St. Dominique, Bagot.
LaSalle Products, Ltd.	199 W. Jean Talon St., Montreal.	Ville St. Michel.
Laurentian Stone Co., Ltd.	195 Nicholas St., Ottawa, Ont.	Wrightville.
Leclerc & Gagnon.	St. Joachim de Montmorency.	Montmorency Dist.
Leclerc, J. J.	Drapeau.	Drapeau.
(*) Leclercier, Victor.	8465 Rue Berri, Montreal.	Cap St. Martin.
Leger and Charlton, Ltd.	400 Notre Dame St., Lachine.	Lachine.
Leroux, L. P.	Beaconsfield.	Beaconsfield.
Levesque, Armand.	Roberval.	Roberval.
(*) Martineau Fils, Ltée.	517 Marie-Anne E. Montreal.	Pont Vian, St. Marc des Carrières.
Mercure, C.	9 rue St. Denis, St. Hyacinthe.	Bagot Co.
Miner, R. H. Co., Ltd.	7411 Delanaudière St., Montreal.	St. Laurent.
Montreal Quarry, Ltd.	6217 Delanaudière St., Montreal.	Montreal.
National Quarries, Ltd.	6301 Park Ave., Montreal.	Côte St. Michel.
(*) Noel, Oscar.	61 Montcalm St., Hull.	Wrightville.
Paquette, Lévis, et Cie.	Cap St. Martin.	Cap St. Martin.
(*) Pearson, Honoré.	Port Daniel Station.	Bonaventure Co.
Quebec Dept. of Highways.	Quebec.	Various.
St. Francis Rock Products and Equipment, Ltd.	8050 Bloomfield Ave., Montreal.	St. Laurent Parish.
St. Michel Lime Co.	8476 Lajeunesse Blvd., Montreal.	Montreal.
Schetsagne, Wilfrid.	309 Ford du Lac, Pointe-Claire.	Côte St. Charles.
Shawinigan Chemicals, Ltd.	Box 2670, Montreal.	Bedford.
Society Agriculture of Rivière du Loup.	Isle Verte.	St. Eloi.
Standard Clay Products, Ltd.	Box 189, St. Jean.	St. Jean.
Standard Lime Co., Ltd.	Joliette.	St. Paul de Joliette.
St. Laurent Quarry, Ltd.	299 Monkland Blvd., St. Laurent.	Canton Belanger.
St. Onge, Omer.	St. Dominique de Bagot.	St. Dominique.
Théoret, Magloire.	Valleyfield.	Valleyfield.
Trappist Fathers.	Village des Pères.	Village des Pères.
Tremblay, Napoléon.	31 rue Joffre, Hull.	Hull.
Turcotte & Asselin.	Chateau Richer.	Chateau Richer.
Union Construction, Ltd.	4014 Wilson Ave., Montreal.	Caughnawaga.
Union des Carrières & Pavages, Ltée.	3 Blvd. Charest, Quebec.	Charlesbourg.
Valleyfield, City of.	Valleyfield.	New Salisbury.
Verreault, E., Ltd.	194 rue du Pont, Quebec.	Giffard.
Villeneuve, François.	Pointe-au-Pic.	Pointe-au-Pic.
ONTARIO—		
Bourgie, J. B.	Box 50, Embrun.	Russell Co.
Brunner, Mond Canada, Ltd.	Bank of Commerce Bldg., Toronto.	Essex Co.
Canada Cement Co., Ltd.	Phillips Square, Montreal, Que.	Belleville.
Canada Crushed Stone Co., Ltd.	Sun Life Bldg., Hamilton.	Dundas, Hagersville.
Code, W. H.	Smiths Falls.	Oso Twp.
Coldwater Crushed Stone, Ltd.	Coldwater.	Simcoe Co.

NOTE.—(*) Firms operating dressing works in conjunction with quarry.

DIRECTORY OF FIRMS—Continued

Limestone—Concluded

Name	Head office address	Location
ONTARIO—Concluded		
Cook, J. S.	Warton.	Bruce Co.
Decewsville Crushed Stone Co.	Elgin St., Hamilton.	Decewsville.
Edgar Irvine Co., Ltd.	Alexandria.	Harrowsmith, Alexandria.
Falconbridge Nickel Mines.	25 King St. W., Toronto.	Sudbury Dist.
Foster, R. R.	86 Spadina Ave., Ottawa.	Nepean Twp.
Gypsum Lime & Alabastine Can., Ltd.	Paris.	Hespeler, Beachville and Milton.
Hagersville Quarries, Ltd.	Hagersville.	Hagersville.
Haldimand Quarries & Cons., Ltd.	137 Wellington St. W., Toronto.	Hagersville.
Harvey, Harold.	Kingston.	Vernon, Howe Island, Alexandria.
(*) Henniger, M. G.	Smiths Falls.	N. Elmsley Twp.
Innerkip Quarries, Ltd.	Fleet St., Toronto.	Innerkip.
Jamieson Lime Co.	Renfrew.	Renfrew.
(*) Jupp, A. E., Construction Company, Ltd.	170 Berkeley St., Toronto.	Campbellford.
Kehoe, P. J.	Brechin.	Minden Twp.
(*) Kingston Penitentiary.	Dept. of Justice, Ottawa.	Portsmouth.
Kirby, T. Sidney Co., Ltd.	215 Sussex St., Ottawa.	Gloucester Twp.
Kirkfield Crushed Stone, Ltd.	Fleet St., Toronto.	Kirkfield.
Lapierre, M. C.	Owen Sound.	Owen Sound.
Law Construction, Ltd.	225 Sterling Road, Toronto.	Owen Sound.
Limestone Products, Ltd.	1104 Hermant Bldg., Toronto.	N. Orillia Twp.
Longford Quarries, Ltd.	Sun Life Bldg., Hamilton.	Longford Mills.
McGinnis & O'Connor.	412 King St., Kingston.	Collins Bay.
Noranda Mines, Ltd.	1600 Royal Bank Bldg., Toronto.	Haileybury.
North American Cyanamid, Ltd.	Royal Bank Bldg., Toronto.	Beachville.
Northern Development Dept.	Parliament Bldgs., Toronto.	Various.
Ontario Department of Highways.	Parliament Bldgs., Toronto.	Various.
Ontario Reformatory.	Parliament Bldgs., Toronto.	Guelp.
Ontario Rock Co., Ltd.	320 Bay St., Toronto.	Belmont Twp.
Pembroke, Corp. of.	Pembroke.	Pembroke.
Pirson, John.	Stevensville.	Bertie Twp.
(*) Queenston Quarries, Ltd.	76 Sun Life Bldg., Hamilton.	St. Davis.
Rayner Construction, Ltd.	29 Commercial St., Leaside.	Coboconk.
Routly Construction Co., Ltd.	21 Dundas Sq., Toronto.	Rawdon and Portland Twps.
Walker Bros.	Box 586, Thorold.	Stamford Twp.
Wehman, John.	23 Plum St., Kingston.	Kingston Twp.
Windmill Point Crushed Stone Co., Ltd.	Port Colborne.	Port Colborne.
MANITOWA—		
(*) Gillis Quarries, Ltd.	Richards & Spruce Sts., Winnipeg.	Garson, Poplarfield.
(*) Tyndall Quarry Co., Ltd.	1591 Erin St., Winnipeg.	Garson.
(*) Western Stone Co., Ltd.	401 Royal Bank Bldg., Winnipeg.	Garson.
Winnipeg, City of.	Winnipeg.	Stony Mountain.
Winnipeg Supply & Fuel Co., Ltd.	812 Boyd Bldg., Winnipeg.	Spearhill, Stonewall.
ALBERTA—		
Loder's Lime Co., Ltd.	Kananaskis.	Kananaskis.
Summit Lime Works.	Box 273, Lethbridge.	Lethbridge.
BRITISH COLUMBIA—		
Beale, F. G.	Van Anda.	Van Anda.
B. C. Dept. of Highways.	Victoria.	Various.
B. C. Pulp and Paper Co., Ltd.	Bank of Nova Scotia Bldg., Vancouver.	Quatsino M.D.
Christensen, P. (Koeve Lime Quarries).	Namu.	Namu.
Cons. Mining & Smelting Co. of Canada, Ltd.	Trail.	Proctor.
(*) Coulter, Thomas Hugh.	Van Anda.	Van Anda.
Deeks Sand & Gravel Co., Ltd.	101 W. 1st Ave., Vancouver.	Seymour Creek, Coquitlam.
Fife Lime Quarry.	957 Rossland Ave., Trail.	Fife.
(*) (b) Johnson, August.	Ritchie.	Ritchie.
Pacific Lime Co., Ltd.	744 Hastings St., Vancouver.	Texada Island.
Reynolds, H.	2475 Charles St., Vancouver.	Yale Dist.
Trail, City of.	Trail.	Trail.

Marble

QUEBEC—		
Canada Marble & Lime Co. Reg.	74 Blvd. Levesque, Montreal.	L'Annonciation.
(*) Wallace Sandstone Quarries, Ltd.	132 St. James St. W., Montreal.	Philipsburg.
White Grit Co.	Hurdman Rd., Ottawa, Ont.	Portage du Fort.
ONTARIO—		
(*) American Marble Co., Ltd.	171 Yonge St., Toronto.	Bancroft.
(*) Bolender Bros. (White Star Mine).	Haliburton.	Haliburton.
Bonter Marble & Calcium Co., Ltd.	Box 61, Marmora.	Marmora Twp.
Connolly Marble Mosaic & Tile Co., Ltd.	316 Dupont St., Toronto.	Madoc Twp.
Orser, S. H. (ornamental stone products).	Verena.	Verona.
(*) Rock Construction Co., Ltd.	328 Dupont St., Toronto.	Bancroft.
Silverstone Black Marble Quarries, Ltd.	305 O'Connor St., Ottawa.	St. Albert.
Stockloser, Karl.	Madoc.	Eldorado.

NOTE.—(*) Firms operating dressing works in conjunction with quarry.

DIRECTORY OF FIRMS—Concluded

Sandstone

Name	Head office address	Location
NOVA SCOTIA—		
Dibblee Construction Co., Ltd.	248 Albert St., Ottawa, Ont.	Mount Uniacke.
Fairview Crushed Stone Co., Ltd.	609 Gottingen St., Halifax.	Fairview.
Nova Scotia Dept., of Highways.	Halifax.	Various.
(*) Wallace Sandstone Quarries, Ltd.	132 St. James St., Montreal, Que.	Wallace.
NEW BRUNSWICK—		
(*) Smith, E. A.	Shediac.	Shediac.
QUEBEC—		
Blais, Jos.	10 Ave. Mont-Marie, Lévis.	St. Louis de Pintendre, St. Nicholas.
Chauffage & Ventilation, Ltd.	105 Côte de la Montagne, Quebec.	Leggatt's Point.
Citadel Brick, Ltd.	14 St. Joseph St., Quebec.	Lauzon.
Gagnon & Frère Enrg.	St. David.	St. David.
Paradis & Farley.	1145 St. Gregoire, Montreal.	Rimouski.
Quebec Dept. of Highways.	Quebec.	Various.
Rousseau, T. E.	48, 2nd Ave., Quebec.	Leggatt's Point, New Carlsle.
Vezina, Jos.	Ste. Foy.	Ste. Foy.
Warren & Simard Inc.	Point-au-Pic.	Point-au-Pic.
ONTARIO—		
Campbell Sandstone Quarries, Ltd.	165 Main St., Westboro.	Nepean Twp.
Corner, Austin.	Inglewood.	Inglewood.
Mountain Sandstone Quarry.	Box 307, Georgetown.	Esqueving Twp.
Norton, A. W., Quarries.	Limehouse.	Limehouse.
Sykes, Thos.	Georgetown.	Glen Williams.
Terra Cotta Quarries.	Glen Williams.	Glen Williams.
ALBERTA—		
(*) Oliver, Wm.	Cochrane.	Cochrane.
BRITISH COLUMBIA		
Cons. Mining & Smelting Co., Ltd.	Trail.	Kimberley.
McDonald, J. A. & C. H., Ltd.	1571 Main St., Vancouver.	Haddington and Gabriola Islds.

(a) Receiver for Miramichi Quarry Co., Ltd.

Slate

QUEBEC—		
Broughton Soapstone & Quarry Co., Ltd.	Broughton Station.	Ste. Thérèse Twp.
Williamson & Crombie.	Kingsbury.	Kingsbury.
ONTARIO—		
(*) Crespey Slate Products, Ltd.	Madoc.	Madoc.
(*) Canadian Slate Products, Ltd.	11 King St. W., Toronto.	Madoc.
BRITISH COLUMBIA—		
Brown, O. M.	Kapoor.	Kapoor.

NOTE.—(*) Firms operating dressing works in conjunction with quarry.

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General reports on the sections of manufactures covered by the Mining, Metallurgical and Chemical Branch are issued as follows:—

Annual Printed Reports—

Iron and Steel and Their Products: Primary Iron and Steel (Pig Iron, Ferro-Alloys, Steel and Rolled Products) — Castings and Forgings — Heating and Cooking Apparatus—Boilers, Tanks and Engines—Farm Implements—Machinery—Automobiles—Auto Parts—Bicycles—Aircraft—Shipbuilding—Railway Rolling Stock—Wire and Wire Goods—Sheet Metal Products—Hardware, Tools and Cutlery—Bridge Building and Structural Steel—Miscellaneous Iron and Steel Products.

Manufactures of Non-Ferrous Metals: Aluminium Products—Brass and Copper Products—White Metal Alloys—Jewellery and Silverware—Electrical Apparatus and Supplies—Miscellaneous Non-Ferrous Metal Products—Non-Ferrous Metal Smelting and Refining.

Manufactures of Non-Metallic Minerals: Asbestos Products—Cement—Cement Products—Coke and Gas—Glass (blown, cut, ornamental, etc.)—Lime—Petroleum Products—Products from Domestic Clays—Products from Imported Clays—Salt—Sand—Lime Brick—Stone Dressing—Artificial Abrasives and Abrasive Products—Miscellaneous Non-Metallic Mineral Products, including (a) Artificial Graphite and Electrodes, (b) Gypsum Products, (c) Mica Products, (d) Magnesite Products, (e) Non-Metallic Mineral Products, n.e.s.

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Quarterly Reports—

**Production and Sales of Radio Receiving Sets.
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Coal and Coke Statistics for Canada.
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SPECIAL REPORTS—

The Fertilizer Trade in Canada. (Annual.)
Directory of Chemical Industries in Canada as of January 1, 1938.
Consumption of Chemicals in Municipal Waterworks, 1936 and 1937.

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CANADA—DEPARTMENT OF TRADE AND COMMERCE
DOMINION BUREAU OF STATISTICS
MINING, METALLURGICAL AND CHEMICAL BRANCH

ANNUAL REPORT
ON THE
MINERAL PRODUCTION OF
CANADA

DURING THE CALENDAR YEAR

1938

Published by Authority of the Hon. James A. MacKinnon, M.P.,
Minister of Trade and Commerce



OTTAWA
EDMOND CLOUTIER
PRINTER TO THE KING'S MOST EXCELLENT MAJESTY
1940

Price, 50 cents



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PREFACE

The first statistical report on the mineral production of Canada was issued by the Geological Survey in 1886. In 1907 the work of the Mines section of the Geological Survey was transferred to the Mines Branch of the then newly organized Department of Mines. In 1921 the work was again transferred to the Mining, Metallurgical and Chemical Branch of the Dominion Bureau of Statistics.

The present report contains final data on Canada's mineral production, together with details of the capital employed in the mining industry, salaries and wages paid, the number of employees, the amount expended on fuel and power, and the power-producing equipment installed. For reasons of economy, certain tables, generally included in this report, have been abbreviated or deleted.

Tables of production by different countries of the world are included for the purpose of assisting those who may be making international studies of production and who may not have a good reference library readily at hand. These tables are taken from the annual statistical summary of the Mineral Industry of the British Empire and Foreign Countries, published by the Imperial Institute in London, and their use here is gratefully acknowledged.

For purposes of easy reference and, in view of the recent and increasing interest in inter-provincial relations, a historical summary of all available statistics relating to mineral production by the various provinces or territories of Canada has been included in Chapter I of the present report. Corresponding data of mineral production of the Dominion, as a whole, were shown in the annual mineral production report for 1937.

As in previous years, the Bureau co-operated with the Mines Departments of the provinces of Nova Scotia, New Brunswick, Quebec, Ontario, Manitoba, Saskatchewan and British Columbia, in the collection of these statistics. Forms are filled out in duplicate, thereby saving the operator extra work and resulting in uniform totals for the provincial and Dominion statistical bureaux.

The thanks of the Bureau are tendered to the mine and smelter operators for assistance given and information made available. Railway and other transportation companies as well as smelter operators outside of Canada have also furnished data, the receipt of which is gratefully acknowledged.

The report has been prepared under the direction of Mr. W. H. Losee, B.Sc., F.C.I.C., Chief of the Mining, Metallurgical and Chemical Branch, by Mr. R. J. McDowall, B.Sc., and Mr. B. R. Hayden, of the mineral division staff.

R. H. COATS,
Dominion Statistician.

DOMINION BUREAU OF STATISTICS,
OTTAWA, May 20, 1940.

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DOMINION BUREAU OF STATISTICS

R. H. COATS, LL.D., F.R.S.C., F.S.S. (Hon.), Dominion Statistician
W. H. LOSEE, B.S., Chief of the Mining, Metallurgical and Chemical Branch

ANNUAL REPORT

ON THE

MINERAL PRODUCTION OF CANADA

DURING THE CALENDAR YEAR 1938

CHAPTER ONE

The value of Canadian mineral production in 1938 totalled \$441,823,237 compared with the all-time high record of \$457,359,092 in 1937. The decrease in total value did not entirely reflect a general or pronounced decline in the output of mineral wealth but rather the distinctly lower average prices realized in 1938 for the major base metals.

During the year under review the Canadian mining industry established all-time high records in the output of gold, copper, lead, zinc, tellurium, the platinum metals, petroleum, natural gas and sands and gravels. The value of production by the metal mining industry alone totalled \$323,075,154 in 1938 compared with \$334,165,243 in 1937. The value of coal and other fuels, including petroleum and natural gas amounted to \$64,803,294 as against \$65,828,879 in the preceding year; shipments and sales of asbestos, salt, gypsum and other non-metallic minerals, classified as industrial, were reported at \$20,066,123 in 1938, a decrease of \$2,429,148 from the corresponding value for 1937. The value of clay products, including various grades of building brick and tile, increased from \$4,516,859 in 1937 to \$4,536,084 while the combined value of other structural materials, such as, cement, lime, sand, gravel and stone declined from a total of \$30,352,840 in 1937 to \$29,342,582 in 1938.

Ontario, Quebec and British Columbia continued in 1938 as the more important mineral producing provinces. Production during the year, in the first named province, amounted to \$219,801,994, in Quebec the output was valued at \$68,965,594 and in British Columbia \$64,549,130. The corresponding values for other provinces and the Territories were, Alberta \$28,966,272; Nova Scotia \$26,253,645; Manitoba \$17,173,002; Saskatchewan \$7,782,847; Yukon \$3,959,570; New Brunswick \$3,802,565 and Northwest Territories \$568,618.

Commencement in the milling of auriferous quartz ores in the Northwest Territories, in addition to the continued production of pitchblende-silver ores, contributed largely to the pronounced increase in the value of mineral wealth produced during 1938 in this part of the Dominion. The value of gold recovered in all gold mining sections of Canada in 1938 totalled \$166,205,990 or 38 per cent of the value of production during the year of the entire Canadian mining industry. This value of Canadian gold output, compared with a corresponding value of \$39,861,663 in 1929, emphasizes the remarkable expansion and success in the development of gold-bearing ores within the last decade.

Coal mining in Nova Scotia, New Brunswick, Saskatchewan, Alberta and British Columbia continued in 1938 as an important factor in the economic life of these provinces and the efficient development of the petroleum resources of Western Canada was exemplified in the greatest annual output of this fuel ever to be attained in the oil fields of Alberta.

As a world producer of minerals and primary metals Canada, in 1938, ranked first in asbestos, platinum metals and nickel; second in radium and uranium, third in gold, silver, aluminum (from imported ores) and copper and fourth in lead and zinc (spelter). Among other products of the Canadian metal mining industry in 1938 were arsenic, bismuth, cadmium, cobalt, tellurium, selenium, titanium ore and molybdenite; also for the first time in many years a relatively small quantity of mercury was recovered from British Columbia ores and during the first half of 1939 important quantities of refined antimony were produced in the same province by the Consolidated Mining and Smelting Company of Canada Limited; later in 1939 shipments of tungsten concentrates were made from a property in the Cariboo area, British Columbia.

Some of the more important developments in the industrial mineral mining industries of Canada included the rather rapid increase in the production of nepheline-syenite as a competitor of feldspar for certain ceramic purposes and the investigation of brucite bearing rocks occurring in or near the Ottawa valley; the mineral brucite ($\text{MgO} \cdot \text{H}_2\text{O}$) is a potential raw material for the manufacture of high quality refractories and the metal magnesium.

While mining is one of the few industries showing improvement in employment in 1938 over 1937, the gain was not equal to that reported in the preceding year over 1936. In coal mining the index of employment averaged 90.4 (1926=100), the same as in 1937. Employment in the extraction of metallic ores generally was brisker than in 1937, or any other year for which statistics are available; the annual index, at 317.8, was $14\frac{1}{2}$ points above the average of 303.3 in the preceding twelve months. Non-metallic mineral mining industries (other than fuels), afforded less employment in 1938 than in 1937, although the situation continued better than in 1936 and immediate preceding years. During 1938 the Canadian mining industry, including all divisions, distributed \$145,644,000 in salaries and wages to 107,275 employees and consumed fuel, purchased electricity and process supplies aggregating \$85,993,800.

The serious and ominous events, chiefly of a political nature, occurring in Europe and the Far East throughout 1938, gradually stimulated interest in the strategic position of Canada with regard to her economic resources and potential war materials, especially metals, and in this regard it is both interesting and very encouraging to note the tremendously improved position of the Dominion as compared with her productive capacity during the war years of 1914-1918. The following data relating to the Canadian production of certain metals and non-metallic minerals and products in 1917 and 1938 reflect this very much stronger position:—

Gold 1938—fine ounces 4,725,117 \$166,205,990 (1917 fine ounces 738,831 \$15,272,992).

Copper 1938—pounds 571,249,664 \$56,554,034 (1917 pounds 109,227,332 \$29,687,980).

Lead 1938—pounds 418,927,660 \$14,008,941 (1917 pounds 32,576,281 \$3,628,020).

Zinc 1938—pounds 381,506,588 \$11,723,698 (1917 pounds 29,668,764 \$2,640,817).

Nickel 1938—pounds 210,572,738 \$53,914,494 (1917 pounds 84,330,280 \$33,732,112).

Cadmium 1938—pounds 699,138 \$561,799 (1917 nil).

Platinum metals 1938—fine ounces 292,219 \$8,874,136 (1917 fine ounces 105,340).

Asbestos 1938—tons 289,793 \$12,890,195 (1917 tons 153,781 \$7,230,383).

Petroleum 1938—barrels 6,966,084 \$9,230,173 (1917 barrels 213,832 \$542,239).

Natural sodium sulphate 1938—tons 63,009 \$553,307 (1917 nil).

During the post-war years, large and modern metallurgical works were completed and great hydro-electric networks erected to service the mine, smelter and refinery, thus it is today that the Dominion is producing gold in almost ever increasing quantities, together with the highest grades of refined base metals, including lead, zinc, copper, aluminum, nickel, cobalt, cadmium, tellurium, selenium, bismuth and antimony. In conjunction with the growth of the non-ferrous smelting and refining industry was a corresponding development in those manufacturing industries that process and fabricate these primary products of the Canadian mine or refinery. Thus has Canada advanced to the very vanguard of the world's more progressive and industrial nations.

Table 1.—Mineral Production of Canada, by Provinces, 1938

	Saskatchewan	Alberta	British Columbia	Northwest Territories	Yukon	Canada
METALLICS						
Antimony (a).....lb.						24,560
.....\$						2,290
Arsenic (As ₂ O ₃).....lb.						2,175,646
.....\$						56,538
Bismuth.....lb.						9,156
.....\$						9,754
Cadmium.....lb.	73,630		510,342			699,138
.....\$	59,166		410,090			561,799
Chromite.....ton						
.....\$						
Cobalt.....lb.						459,226
.....\$						790,913
Copper.....lb.	18,156,157		65,759,265	75,567		571,249,664
.....\$	1,810,532		6,557,514	7,535		56,554,034
Gold.....fine oz.	50,021	305	605,617	6,800	72,368	4,725,117
.....(standard \$)	1,034,026	6,305	12,519,214	140,568	1,495,979	97,676,534
Estimated exchange equilization on gold produced.....\$	725,463	4,423	8,783,364	98,622	1,049,565	68,529,156
Lead.....lb.			413,706,307		5,198,990	418,927,660
.....\$			13,834,339		173,854	14,008,941
Manganese ore.....ton						
.....\$						
Mercury.....lb.			760			760
.....\$			760			760
Molybdenite (concentrates).....ton						7
.....\$						4,500
Nickel.....lb.						210,572,738
.....\$						53,914,494
Palladium, rhodium, iridium, etc...fine oz.						136,893
.....\$						3,677,342
Platinum.....fine oz.						161,326
.....\$			16			5,196,794
.....\$			515			(b)
Radium and uranium (products).....lb.				(b)		(b)
Selenium.....lb.	28,612					358,929
.....\$	49,642					622,742
Silver.....fine oz.	898,413	23	11,186,563	581,902	2,844,659	22,219,195
.....\$	390,603	10	4,863,582	252,993	1,236,772	9,660,239
Tellurium.....lb.	2,206					48,237
.....\$	3,794					82,967
Titanium ore.....ton						207
.....\$						1,449
Zinc.....lb.	29,962,597		299,363,564			381,506,588
.....\$	920,751		9,199,443			11,723,698
Total Metallics.....\$	4,993,977	10,738	56,168,821	499,718	3,956,170	323,075,154
NON-METALLICS—FUELS						
Coal.....ton	1,022,166	5,251,233	1,440,287		361	14,294,718
.....\$	1,380,416	13,698,470	5,237,077		3,400	43,982,171
Natural gas.....M cu. ft.	90,285	21,822,108		1,500		33,444,791
.....\$	34,136	4,807,346		335		11,587,450
Peat.....ton						620
.....\$						3,500
Petroleum, crude.....bbl.		6,751,312		22,855		6,966,084
.....\$		8,775,094		68,565		9,230,173
Total Fuels.....\$	1,414,552	27,280,910	5,237,077	68,900	3,400	64,503,294
Other Non-Metallic and Industrial Minerals						
Asbestos.....ton						289,793
.....\$						12,890,195
Bituminous sands (c).....ton						
.....\$						
Diatomite.....ton			14			398
.....\$			362			13,842
Feldspar.....ton						14,058
.....\$						129,293
Fluorspar.....ton						217
.....\$						3,906
Graphite.....ton						41,590
Grindstones (includes pulpstones, etc.).....ton						306
.....\$						16,198
Gypsum.....ton			17,451			1,008,799
.....\$			100,080			1,502,265
Iron oxides (ochre).....ton			434			5,821
.....\$			4,560			71,769
Magnesitic-dolomite.....ton			470			420,261
.....\$			9,400			470
Magnesium sulphate.....ton			96,250			9,400
.....lb.			1,562			1,037,026
.....\$						80,980

Table 1.—Mineral Production of Canada, by Provinces, 1938—Continued

	Nova Scotia	New Brunswick	Quebec	Ontario	Manitoba
Other Non-Metallic and Industrial Minerals (concluded)					
Mineral waters..... Imp. gal.			159,893	28,416	
Nepheline-syenite..... \$			19,033	2,586	
Phosphate..... ton			208	142,737	
Quartz..... ton	4,701		1,886	1,173,259	
Salt..... ton	8,415		85,153	597,037	
Silica brick..... M	44,950		315,251	388,130	2,920
Soapstone (+)..... \$	194,759			1,637,140	34,979
Sodium carbonate..... ton	1,193			595	
Sodium sulphate..... ton	49,811		35,038	50,592	
Sulphur (x)..... ton			16,580	16,897	
Talc..... ton			98,261	168,970	
				10,853	
				109,810	
Total Other Non-Metallics..... \$	1,181,854	168,395	13,982,994	3,069,247	127,559
CLAY PRODUCTS AND OTHER STRUCTURAL MATERIALS					
CLAY PRODUCTS					
Clay—					
Fireclay..... ton	1,307	40			
Bentonite..... ton	4,038	1,596			
Brick—					
Soft mud process—					
Face..... M		25		10,813	
Common..... M	342	1,415	2,486	208,110	4,395
Stiff mud process (wire cut)—					
Face..... M	477	1,157	14,440	16,215	784
Common..... M	10,767	27,780	286,323	302,241	18,117
Dry press—					
Face..... M	4,283	2,273	24,875	14,809	967
Common..... M	54,918	28,829	337,876	208,388	12,559
Fancy or ornamental brick..... M					
Sewer brick..... M					
Paving brick..... M					
Firebrick..... M					
Fireclay blocks and shapes..... \$	2		1,877	9,928	
Structural tile—					
Hollow blocks..... ton	727		47,508	192,618	
Roofing tile..... No.			4,571	3,886	
Floor tile (quarries)..... Sq. ft.			71,309	58,558	
Drain tile..... M				63	
Sewer pipe, copings, flue linings, etc..... \$				4,175	
Pottery, glazed or unglazed..... \$				228	
Other clay products..... \$				3,581	
Total Clay Products..... \$	340,253	123,625	1,022,194	2,083,496	105,334
OTHER STRUCTURAL MATERIALS					
Cement..... brl.			2,730,320	1,818,032	330,889
Lime (a)..... ton	12,351	15,247	3,693,188	2,555,214	754,427
Sand and gravel..... ton	110,648	119,556	137,314	270,478	19,824
Stone (a)..... ton	2,077,378	3,833,540	843,331	1,989,259	198,685
	1,013,266	1,825,383	12,523,404	8,531,281	1,216,084
	63,662	13,279	3,532,873	3,046,043	645,812
	146,944	120,325	2,196,384	2,513,291	39,378
			2,527,928	2,323,165	101,617
Total Other Structural Materials..... \$	1,270,858	2,065,264	10,597,320	9,913,681	1,700,541
Grand Total..... \$	26,253,645	3,802,565	68,965,594	219,801,994	17,173,002

(x) Sulphur content of pyrites shipped and estimated sulphur contained in sulphuric acid and elemental sulphur made from waste smelter gases. (+) Includes some talc.

(a) Data relating to production now included with those of petroleum refining.

Table 1.—Mineral Production of Canada, by Provinces, 1938—Concluded

	Saskat- chewan	Alberta	British Columbia	Northwest Territories	Yukon	Canada
Other Non-Metallic and Industrial Minerals (concluded)						
Mineral waters.....imp. gal.						188,309
Nepheline-syenite.....\$						21,619
Phosphate.....ton						142,737
Quartz.....ton	116,898					208
Salt.....ton	40,914					1,886
Silica brick.....M		4,045				1,380,011
Soapstone (+).....\$		46,035				961,617
Sodium carbonate.....ton				252		440,045
Sodium sulphate.....\$			2,268			1,912,913
Sulphur (x).....ton	62,920	89				100,403
Talc.....\$	552,180	1,127				39,038
			78,918			252
			777,586			2,268
						553,009
						553,307
						112,395
						1,044,817
						10,853
						109,810
Total Other Non-Metallics.....\$	593,094	47,162	895,818			20,066,123
CLAY PRODUCTS AND OTHER STRUCTURAL MATERIALS						
CLAY PRODUCTS						
Clay—						
Fireclay.....ton	530		467			2,344
Bentonite.....\$	5,120		6,489			17,243
Brick—		1,136	43			1,179
Soft mud process—		3,444	215			3,659
Face.....M						10,838
Common.....M	50	1,058	5,262			208,610
Stiff mud process (wire cut)—		13,692	72,311			24,104
Face.....M	153	202	751			313,082
Common.....M	3,814	3,225	19,204			34,179
Dry press—	250	1,717	1,560			671,471
Face.....M	2,498	12,196	24,480			50,734
Common.....M	51	1,095	174			681,744
Fancy or ornamental brick.....\$	1,788	16,343	7,782			13,125
Sewer brick.....M		7,079				266,039
Paving brick.....\$		62,874				15,536
Firebrick.....M						192,741
Fireclay blocks and shapes.....\$						63
Structural tile—						4,175
Hollow blocks.....ton	995	3,387	3,137			228
Roofing tile.....\$	8,119	29,418	30,258			3,581
Floor tile (quarries).....No.			300			1
Drain tile.....\$			13			34
Sewer pipe, copings, flue linings, etc.....\$			958			2,213
Pottery, glazed or unglazed.....\$			140			113,581
Other clay products.....\$			953			73,512
		92				
		3,552	32,071			
		93,071	55,068			
		138,519	9,699			
	17,414		1,435			
Total Clay Products.....\$	118,713	377,337	365,132			4,536,084
OTHER STRUCTURAL MATERIALS						
Cement.....brl.		304,373	335,488			5,519,102
Lime (a).....\$		611,790	626,731			8,241,350
Sand and gravel.....ton		12,053	19,655			486,922
Stone (a).....\$		107,012	174,161			3,542,652
	1,037,753	792,760	2,211,682			32,223,882
	662,511	525,175	751,491			12,002,554
		1,691	288,337			5,116,022
		6,148	329,899			5,556,026
Total Other Structural Materials...\$	662,511	1,250,125	1,882,282			29,342,582
Grand Total.....\$	7,782,847	28,966,272	64,549,130	568,618	3,959,570	441,823,237

Table 2.—Quantities and Values of Mineral Products from Canadian Sources, 1937 and 1938

		1937		1938*	
		Quantity	Value	Quantity	Value
			\$		\$
METALLICS					
Antimony†.....	lb.	48,163	7,394	24,560	2,200
Arsenic (As ₂ O ₃).....	lb.	1,389,426	41,032	2,175,646	56,538
Bismuth.....	lb.	5,711	5,654	9,516	9,754
Cadmium.....	lb.	745,207	1,222,140	699,138	561,799
Chromite.....			43,250		
Cobalt.....	lb.	507,064	848,145	459,226	790,913
Copper.....		530,028,615	68,917,219	571,249,664	56,554,034
Gold valued at standard rate.....	fine oz.	4,096,213	84,676,235	4,725,117	97,676,834
Estimated exchange equalization on gold produced.....			58,650,258		68,529,156
Lead.....	lb.	411,999,484	21,053,173	418,927,660	14,008,941
Manganese ore.....	tons	85	817		
Mercury.....	lb.			760	760
Molybdenite concentrates.....	tons	8	8,147	7	4,500
Nickel.....	lb.	224,905,046	59,507,176	210,572,738	53,914,494
Palladium, rhodium, iridium, etc.....	fine oz.	119,829	3,179,782	130,893	3,677,342
Platinum.....	fine oz.	139,377	6,752,816	161,326	5,196,794
Radium and uranium products.....		(a)		(a)	
Selenium.....	lb.	397,227	687,203	358,929	622,742
Silver.....	fine oz.	22,977,751	10,312,644	22,219,195	9,660,239
Tellurium.....	lb.	41,490	71,777	48,327	82,967
Titanium ore.....	tons	4,229	26,432	207	1,449
Zinc.....	lb.	370,337,589	18,153,949	381,506,588	11,723,698
Total.....			334,165,243		323,075,154
NON-METALLICS—FUELS					
Coal.....	tons	15,835,954	48,752,048	14,294,718	43,982,171
Natural gas.....	M cu. ft.	32,380,991	11,674,802	33,444,791	11,587,450
Peat.....	tons	478	2,676	620	3,500
Petroleum, crude.....	brls.	2,943,750	5,399,353	6,966,084	9,230,173
Total.....			65,828,879		64,803,294
OTHER NON-METALLICS					
Asbestos.....	tons	410,026	14,505,791	289,793	12,890,195
Bituminous sands (b).....	tons	35	142		
Diatomite.....	tons	643	18,606	398	13,842
Feldspar.....	tons	21,346	178,222	14,058	129,293
Fluorspar.....	tons	150	2,550	217	3,906
Graphite.....			125,343		41,590
Grindstones.....	tons	412	21,429	306	16,198
Gypsum.....	tons	1,047,187	1,540,483	1,008,799	1,502,265
Iron oxides (ochre).....	tons	6,197	83,640	5,821	71,769
Lithium minerals.....	\$		1,694		
Magnesitic dolomite.....	\$		677,207		420,261
Magnesium sulphate.....	tons	727	14,456	470	9,400
Mica.....	tons	945	133,731	519	80,989
Mineral waters.....	Imp. gals.	225,019	20,586	188,309	21,619
Nepheline syenite.....	\$		121,481		142,737
Phosphate.....	tons	100	900	208	1,886
Quartz.....	tons	1,377,448	1,129,011	1,380,011	961,617
Salt.....	tons	458,957	1,799,465	440,045	1,912,913
Silica brick.....	M	3,744	181,126	1,788	100,403
Soapstone (d).....	\$		40,513		35,038
Sodium carbonate.....	tons	286	2,574	252	2,268
Sodium sulphate.....	tons	79,884	618,028	63,009	553,307
Sulphur**.....	tons	130,913	1,154,992	112,395	1,044,817
Talc.....	tons	12,457	123,301	10,853	109,810
Total.....			22,495,271		20,066,123
CLAY PRODUCTS AND OTHER STRUCTURAL MATERIALS					
Clay Products—Total.....			4,516,859		4,536,084
OTHER STRUCTURAL MATERIALS					
Cement.....	brls.	6,168,971	9,095,867	5,519,102	8,241,350
Lime (c).....	tons	549,353	3,824,917	486,922	3,542,652
Sand and gravel.....	tons	27,001,301	10,492,696	32,223,882	12,002,554
Stone (c).....	tons	6,935,612	6,939,360	5,116,022	5,556,026
Total.....			30,352,840		29,342,582
Grand Total in Canadian Funds.....			457,359,092		441,823,237

(a) Data not available for publication.

** Sulphur content of pyrites shipped and estimated sulphur contained in sulphuric acid and other products made from waste smelter gases.

† Metal content of concentrates exported.

(b) Commencing 1938 production included with that of petroleum refining.

(c) Includes relatively large quantities used as a chemical material.

* Unless otherwise noted, all total values of mineral production from 1931 to 1938 inclusive, contain estimated exchange equalization on gold produced.

(d) Includes some talc.

FOREIGN EXCHANGE, 1938

(Internal Trade Branch)

Fluctuations in foreign exchanges were of unusual magnitude in 1938. Due to domestic unsettlement and other adverse factors, French francs were repeatedly under pressure. Following several political crises the franc was formally devalued on May 5 and a minimum rate of 179 francs to the £ sterling was established. This move resulted in considerable repatriation of French capital which placed a strain on other European currencies, notably the pound sterling. Pressure on sterling, however, did not assume serious proportions until July when the Sudetan situation became more critical. The pound was also affected by the increasingly unfavourable British trade balance at this time. It had been steady around \$5.00 during the first six months of the year, but subsequently dropped rapidly to a low of \$4.7995 on September 27. The signing of the Munich Accord was followed by some recovery and sterling rates ruled firmer for the next six weeks. Another relapse in November brought them to a 1938 low of \$4.6564 on the 26th, which resulted in official intervention by the British Equalization fund and a secondary rise in sterling rates to \$4.710. The flow of capital from London to New York during the autumn crisis was very heavy, averaging about 375 million dollars a month. Bar gold at London touched an all-time high of 150s. on November 26 coinciding with the low point in sterling quotations. At the height of the September crisis the United States dollar was quoted at a premium of 2 per cent in contrast to a small discount which ruled during the opening months of the year. This premium had been reduced to 1 per cent by the end of December.

Table 3.—Exchange Quotations at Montreal, 1938

NOTE.—The noon rates in Canadian funds upon which these averages are based have been supplied by the Bank of Canada

—	New York Funds	London Sterling	France Franc	Italy Lira	Australia (Pound)	Germany Reichs- mark	Japan Yen	Union of South Africa (Pound)
	\$	\$	\$	\$	\$	\$	\$	\$
January.....	1.0001	5.0003	.0334	.0526	4.0002	.4029	.2905	4.9941
February.....	.9997	5.0165	.0329	.0526	4.0128	.4041	.2903	5.0103
March.....	1.0028	4.9984	.0313	.0528	3.9984	.4035	.2896	4.9923
April.....	1.0054	5.0061	.0312	.0529	4.0049	.4041	.2916	5.0004
May.....	1.0082	5.0081	.0284	.0530	4.0058	.4049	.2918	5.0018
June.....	1.0107	5.0116	.0281	.0532	4.0093	.4070	.2920	5.0053
July.....	1.0054	4.9562	.0278	.0529	3.9638	.4040	.2887	4.9500
August.....	1.0034	4.8970	.0274	.0528	3.9176	.4023	.2854	4.8909
September.....	1.0062	4.8335	.0271	.0529	3.8670	.4021	.2818	4.8275
October.....	1.0093	4.8120	.0269	.0531	3.8509	.4042	.2806	4.8076
November.....	1.0072	4.7413	.0265	.0530	3.7931	.4033	.2762	4.7333
December.....	1.0092	4.7133	.0266	.0531	3.7707	.4045	.2747	4.7075

PRICE REVIEW, 1938

(Internal Trade Branch, Dominion Bureau of Statistics)

The decline in non-ferrous metal prices which began in the second quarter of 1937, was carried through the first half of 1938. World stocks of most basic metals increased during this period but subsequently, as consumption was accelerated, markets strengthened. The extent of this movement may be gauged from index numbers of the prices of non-ferrous metals and their products which fell from 72.7 in January to 67.8 in June, recovered to the year's high of 73.0 in October, and then closed easier at 71.5.

Major recessions during the first six months occurred in zinc, lead, copper, tin and smaller losses were shown by silver and aluminium. Domestic zinc, f.o.b. Montreal dropped from \$4.10 to \$3.71 per cwt. between January and June, recovered to \$4.07 in October and closed at \$3.78 per cwt. Domestic lead on the same basis declined 42 cents per cwt. during the first half of the year to \$3.93 but regained about half of this loss in the following six months. Electrolytic domestic copper fell to \$9.42 per cwt. in June netting a loss of \$1.36 from January. Prices then moved forward to \$11.58 per cwt. in October but dropped back 73 cents in the last two months. Due chiefly to the continuance of the United States Treasury's buying policy, silver prices held comparatively steady in 1938, although weakness in world markets accompanied recurrent periods of uncertainty concerning the position of the United States Government. On March 28, the Treasury lowered the basic price 1 cent to 44 cents per ounce. The following day this was further reduced to 43 cents at which level it held till the close of the year. An average price for fine silver at New York moved down from 44.8 cents per ounce (Canadian funds) in January to 43.0 cents in April and remained close to that level for the balance of the year.

Table 4.—Metal Prices, 1934-1938

Metal	Market	Unit	1934	1935	1936	1937	1938
			\$	\$	\$	\$	\$
Antimony (ordinaries).....	New York.....	Pound....	0-08901	0-13616	0-12240	0-15355	0-12349
Arsenic, white (nominal).....	New York.....	Pound....	0-04	0-035	0-035	0-03	0-03000
	(New York.....	Pound....	0-08428	0-08649	0-09474	0-13167	0-1000
Copper.....	(Montreal.....	Pound....	0-0822	0-08488	0-10070	0-13886	0-1055
	London.....	Long ton.	33-319	35-430	42-650	59-339	40-707
Gold (in Canadian funds).....		Fine oz.	34-50	35-19	35-03	34-99	35-175
	(New York.....	Pound....	0-03860	0-04065	0-04710	0-06009	0-0474
Lead.....	(Montreal.....	Pound....	0-04488	0-03925	0-04642	0-05799	0-04176
	London.....	Long ton.	10-935	14-238	17-599	23-326	15-266
Nickel.....	New York.....	Pound....	0-35	0-35	0-35	0-35	0-35
Platinum.....	London.....	Fine oz.	*7-75	*7-325	*8-138	*9-811	*6-55
Silver.....	New York.....	Fine oz.	0-47973	0-64273	0-45087	0-44881	0-43225
Tin.....	New York.....	Pound....	0-52191	0-50420	0-46441	0-54337	0-42301
	(St. Louis.....	Pound....	0-04158	0-04328	0-04901	0-06519	0-0461
Zinc.....	(Montreal.....	Pound....	0-04059	0-03992	0-04153	0-05593	0-039
	London.....	Long ton.	13-657	14-082	14-920	22-258	13-990

NOTE.—All prices in dollars per unit excepting London copper, lead and zinc prices which are quoted in pounds sterling per long ton.

* Prices for platinum are quoted in pounds sterling per fine ounce.

Table 5.—Metal Prices by Months, 1937 and 1938

Month	Copper (Electrolytic)				Pig Lead					
	New York (in cents per pound)		London (In £ sterling per long ton)		Montreal (In cents per pound)		New York (In cents per pound)		London (In £ sterling per long ton)	
	1938	1937	1938	1937	1938	1937	1938	1937	1938	1937
January.....	10-198	12-415	45-387	56-497	4-352	6-670	4-870	6-000	16-135	27-272
February.....	9-775	13-427	43-563	64-013	4-220	6-793	4-632	6-239	15-402	28-319
March.....	9-775	15-775	43-582	76-167	4-354	7-690	4-500	7-190	15-992	33-027
April.....	9-775	15-121	43-408	66-614	4-292	6-248	4-500	6-175	15-579	26-014
May.....	9-375	13-775	40-852	63-684	4-010	5-843	4-400	6-000	14-210	24-000
June.....	8-775	13-775	39-417	61-409	3-933	5-632	4-148	6-000	13-969	22-878
July.....	9-585	13-775	44-405	62-807	4-136	5-882	4-882	6-000	14-921	23-932
August.....	9-900	13-775	45-909	63-595	3-975	5-705	4-900	6-452	14-371	22-606
September.....	10-028	13-530	47-148	58-966	4-150	5-317	4-998	6-400	15-249	20-990
October.....	10-760	11-838	51-190	50-619	4-303	4-825	5-100	5-740	16-173	18-259
November.....	11-025	10-797	51-080	44-023	4-261	4-576	5-091	5-033	16-088	16-706
December.....	11-025	10-006	48-988	43-886	4-130	4-402	4-842	4-875	15-106	15-905
Average.....	10-000	13-167	45-411	59-339	4-176	5-799	4-739	6-009	15-266	23-326

Transposed into Canadian funds the average price of copper, based on the London market, was 9.972 cents per pound in 1938 and 13.078 cents in 1937; the average price of lead, based on the same market, was 3.344 cents per pound in 1938 and 5.110 cents in 1937.

Metal Prices by Months, 1937 and 1938

Month	Silver				Zinc					
	New York (In cents per oz. ·999 fine)		London (In pence per oz. ·925 fine)		Montreal (In cents per pound)		St. Louis (In cents per pound)		London (In £ sterling per long ton)	
	1938	1937	1938	1937	1938	1937	1938	1937	1938	1937
January.....	44-750	44-913	19-895	20-734	4-102	5-36	5-000	5-847	14-994	21-153
February.....	44-750	44-750	20-159	20-083	3-987	6-196	4-813	6-465	14-408	25-122
March.....	44-446	45-130	20-088	20-677	3-987	7-779	4-417	7-381	14-364	33-188
April.....	42-750	45-460	18-880	20-740	3-863	6-327	4-141	7-010	13-729	26-216
May.....	42-750	45-025	18-731	20-346	3-679	5-688	4-042	6-750	12-682	23-092
June.....	42-750	44-818	18-945	20-022	3-712	5-334	4-131	6-750	12-890	21-409
July.....	42-750	44-750	19-356	19-986	3-988	5-579	4-745	6-923	14-144	22-568
August.....	42-750	44-750	19-389	19-848	3-834	5-993	4-750	7-192	13-467	24-140
September.....	42-750	44-750	19-300	19-889	3-888	5-438	4-846	7-190	14-040	21-406
October.....	42-750	44-750	19-613	19-942	4-073	4-750	5-012	6-085	15-083	17-722
November.....	42-750	44-750	19-834	19-707	3-907	4-371	4-924	5-630	14-366	15-808
December.....	42-750	44-750	20-083	18-835	3-780	4-298	4-500	5-010	13-709	15-274
Average.....	43-225	44-883	19-523	20-067	3-900	5-593	4-610	6-519	13-990	22-258

The average price of silver in Canadian funds based on the New York market in 1938 was 43-477 cents per fine ounce and in 1937 it was 44-881 cents.
The average price of zinc in Canadian funds based on the London market in 1938 was 3-073 cents per pound and in 1937 it was 4-902 cents.

Table 6.—Annual Values of the Mineral Production of Canada since 1886

NOTE.—In presenting a total valuation of the mineral production as is here given, it should be explained that the production of the metals, copper, gold, lead, nickel, silver, zinc, etc., is given as far as possible on the basis of the quantities of metals recovered in smelters, and the total quantities in each case are valued chiefly at the average market price of the refined metal in a recognized market. There is thus included in some cases the values that have accrued in the smelting or refining of metals outside of Canada.

Year	Value of production	Value per capita	Year	Value of production	Value per capita
	\$	\$		\$	\$
1886.....	10,221,255	2-23	1913.....	145,634,812	19-35
1887.....	10,321,331	2-23	1914.....	128,863,075	16-75
1888.....	12,518,894	2-67	1915.....	137,109,171	17-44
1889.....	14,013,113	2-96	1916.....	177,201,534	22-05
1890.....	16,763,353	3-50	1917.....	189,646,821	23-18
1891.....	18,976,616	3-92	1918.....	211,301,897	25-37
1892.....	16,623,415	3-39	1919.....	176,686,390	20-84
1893.....	20,035,082	4-04	1920.....	227,859,665	26-40
1894.....	19,931,158	3-98	1921.....	171,923,342	19-56
1895.....	20,505,917	4-05	1922.....	184,297,242	20-55
1896.....	22,474,256	4-38	1923.....	214,079,331	23-41
1897.....	28,485,023	5-49	1924.....	209,583,406	22-71
1898.....	38,412,431	7-32	1925.....	226,583,333	24-19
1899.....	49,234,005	9-27	1926.....	240,437,123	25-61
1900.....	64,420,877	12-04	1927.....	247,356,695	25-67
1901.....	65,797,911	12-16	1928.....	274,989,487	27-96
1902.....	63,231,836	11-36	1929.....	310,850,246	31-00
1903.....	61,740,513	10-83	1930.....	279,873,578	27-42
1904.....	60,082,771	10-27	1931.....	230,434,726	22-21
1905.....	69,078,999	11-49	1932.....	191,228,225	18-20
1906.....	79,286,697	12-81	1933.....	221,495,253	20-74
1907.....	86,865,202	13-75	1934.....	278,161,590	25-67
1908.....	85,557,101	13-16	1935.....	312,344,457	28-56
1909.....	91,831,441	13-70	1936.....	361,919,372	32-82
1910.....	106,823,623	14-93	1937.....	457,359,092	41-13
1911.....	103,220,994	14-32	1938.....	441,823,237	39-42
1912.....	135,048,296	18-33			
Grand Total.....				7,620,545,210	*679-86

* Based on an estimated population of 11,209,000 in 1938.

Table 7.—Annual Values of the Mineral Production of Canada, by Classes, since 1929

Year	Metallics	Non-Metallics		Total
		Fuels and other non-metallics	Structural materials and clay products	
	\$	\$	\$	\$
1929.....	154,454,056	97,861,356	58,534,834	310,850,246
1930.....	142,743,764	83,402,349	53,727,465	279,873,578
1931.....	120,930,147	65,346,284	44,158,295	230,434,726
1932.....	112,041,763	56,788,179	22,398,283	191,228,225
1933.....	147,015,593	57,782,973	16,696,687	221,495,253
1934.....	194,110,968	64,763,861	19,286,761	278,161,590
1935.....	221,800,849	67,328,208	23,215,400	312,344,457
1936.....	259,425,194	76,723,437	25,770,741	361,919,372
1937.....	334,165,243	88,324,150	34,869,699	457,359,092
1938.....	323,075,154	84,869,417	33,878,666	441,823,237

Table 8.—Total (Cumulative) Recorded Production in Canada of Specified Metals to December 31, 1938

		Quantity	Value
			\$
Gold.....	(a) fine ounces	65,131,533	1,650,506,113
Silver.....	(b) fine ounces	760,501,360	445,312,647
Copper.....	(c) pounds	6,088,723,243	753,220,387
Nickel.....	(d) pounds	2,580,271,874	746,514,292
Lead.....	(b) pounds	5,985,551,247	277,190,664
Zinc.....	(f) pounds	168,576,418	168,576,418
Cobalt.....	(e) pounds	32,331,094	30,708,382

NOTE.—The total value of production by the entire Canadian mining industry from 1887 to the end of 1938 totalled \$7,620,545,210.

(a) Since 1858; (b) since 1887; (c) since 1886; (d) since 1889; (e) since 1904; (f) since 1898.

Table 9.—Values of the Mineral Production of Canada, by Provinces, since 1929

Year	Nova Scotia	New Brunswick	Quebec	Ontario	Manitoba	Saskatchewan	Alberta	British Columbia	Yukon*
	\$	\$	\$	\$	\$	\$	\$	\$	\$
1929..	30,904,453	2,439,072	46,358,285	117,662,505	5,423,825	2,253,506	34,739,986	68,162,878	2,905,736
1930..	27,019,367	2,383,571	41,215,220	113,530,976	5,453,182	2,368,612	30,427,742	54,953,320	2,521,588
1931..	21,081,157	2,176,910	35,964,537	97,975,915	10,057,805	1,931,880	23,580,901	35,480,701	2,184,917
1932..	16,201,279	2,223,505	25,638,466	85,910,030	9,058,365	1,681,728	21,174,061	27,326,173	2,014,618
1933..	16,966,183	2,107,682	28,141,482	110,205,021	9,026,951	2,477,425	19,702,953	30,794,504	2,073,052
1934..	23,310,729	2,156,151	31,269,945	145,565,871	9,776,934	2,977,061	20,228,851	41,206,965	1,669,083
1935..	23,183,128	2,821,027	39,124,696	158,934,269	12,052,417	3,816,943	22,289,681	48,692,050	1,430,246
1936..	26,672,278	2,587,891	49,736,919	184,532,892	11,315,527	6,970,397	23,305,726	54,407,036	2,390,706
1937..	30,314,188	2,763,643	65,160,215	230,042,517	15,751,645	10,271,463	25,597,117	73,555,798	3,902,506
1938..	26,253,645	3,802,565	68,965,594	219,801,994	17,173,002	7,782,847	28,966,272	64,549,130	4,528,158

* Includes production from the Northwest Territories since 1932; in 1937 the value of production in the Northwest Territories totalled \$117,978 and in 1938 the corresponding value was \$568,618.

Table 10.—Historical Summary of the Mineral Production of Nova Scotia

—	Antimony		Arsenic		Barytes		Clay products	Coal	
	pounds	\$	pounds	\$	tons	\$	\$	tons	\$
1938.....	(a) 24,560	2,200					340,253	6,236,417	22,523,802
1937.....	(a) 48,163	7,394					406,846	7,256,954	25,640,819
1936.....							355,254	6,649,102	22,973,281
1935.....							270,478	5,822,075	20,391,227
1934.....							157,158	6,341,625	21,860,093
1933.....							125,500	4,557,590	15,969,793
1932.....							172,557	4,084,581	15,167,793
1931.....					16	363	467,126	4,955,563	19,016,720
1930.....					66	1,484	495,333	6,252,552	24,528,860
1929.....					105	2,341	653,157	7,056,133	28,071,956
1928.....					127	2,847	496,577	6,743,504	27,427,556
1927.....			35,000	700	56	1,268	416,417	7,071,876	27,194,671
1926.....					100	2,307	362,667	6,747,477	26,845,226
1925.....					95	2,259	†425,710	3,842,978	15,826,680
1924.....			381,092	15,244	151	3,308	†359,288	5,557,441	22,280,554
1923.....			45,000	2,250	209	4,368	413,974	6,597,838	28,170,458
1922.....					289	9,537	431,618	5,509,072	24,629,921
1921.....					270	9,567	361,761	5,734,928	27,782,050
1920.....					751	22,983	541,114	6,429,291	32,238,129
1919.....					468	8,154	432,900	5,720,373	22,078,726
1918.....					580	9,145	303,515	5,818,562	21,095,470
1917.....					3,490	54,027	331,542	6,327,091	19,410,737
1916.....					1,368	19,393	238,470	6,912,140	18,514,662
1915.....	(b) 2,576,000	77,300			550	6,875	221,881	7,463,370	16,669,308
1914.....					612	6,169	266,204	7,370,924	16,452,955
1913.....					641	6,410	332,272	7,980,073	17,812,663
1912.....					464	5,104	272,053	7,783,888	17,374,750
1911.....					50	400	274,249	7,004,420	14,071,379
1910.....							204,782	6,431,142	12,919,705
1909.....					179	1,120	188,185	5,652,089	11,354,643
1908.....					4,312	19,021	117,833	6,652,539	13,364,476
1907.....					1,344	3,000	125,560	6,354,133	12,764,999
1906.....					4,000	12,000	160,506	6,220,505	11,108,044
1905.....					3,360	7,500	†90,146	5,646,583	10,083,184
1904.....					1,382	3,702	†157,762	5,596,241	9,993,288
1903.....					1,163	3,931	†150,100	5,653,338	10,095,246
1902.....					1,096	3,957	†152,025	5,161,316	9,216,636
1901.....					653	3,842	†103,695	4,158,068	6,496,982
1900.....							†108,210	3,623,536	8,088,250
1899.....							†110,695	3,148,822	5,622,898
1898.....							†173,280	2,563,180	4,004,970
1897.....					571	3,060	*	2,493,554	3,896,179
1896.....					145	715	*	2,508,579	3,919,655
1895.....							*	2,225,145	3,476,790
1894.....								2,527,982	3,949,970
1893.....							*	2,444,924	3,820,194
1892.....							*	2,159,389	3,374,046
1891.....								93,611	2,267,919
1890.....								54,755	2,181,033
1889.....								60,520	1,918,827
1888.....									1,942,231
1887.....								56,995	1,858,596
1886.....								43,746	1,698,018
1885.....								50,630	1,547,990
1884.....									1,543,829
1883.....									1,578,609
1882.....									1,524,947
1881.....									1,280,050
1880.....									1,177,669
1879.....									866,220
1878.....									875,994
1877.....									880,215
1876.....									837,755
1875.....									930,613
1874.....									972,954
1873.....									1,108,245
1872.....									1,003,806
1871.....									754,827
1870.....									719,211
1869.....									647,727
1868.....									574,109
1867.....									596,332
1866.....								(c) 2,649,416	4,139,714
Total...		86,894	461,092	18,194	28,663	210,157	12,128,910	291,046,042	812,587,178

* No production recorded, or production not available by provinces.

(a) Metal content of ore.

(b) Ore.

(c) From 1785 to 1866.

Table 10.—Historical Summary of the Mineral Production of Nova Scotia—Continued

—	Copper		Diatomite		Gold		Grindstones		Gypsum	
	pounds	\$	tons	\$	fine oz.	\$	tons	\$	tons	\$
1938.....			384	13,480	26,560	934,248	131	7,006	870,856	908,383
1937.....	180,609	23,620	481	15,392	19,918	696,931	37	4,415	926,796	978,288
1936.....	779,307	73,855	565	11,300	11,960	418,959	70	2,242	729,019	808,294
1935.....			666	26,660	9,376	329,942	50	2,006	454,703	523,216
1934.....			1,320	52,800	3,525	121,613	50	1,762	378,287	488,044
1933.....			1,747	34,940	1,382	39,525	21	868	315,948	363,528
1932.....			1,438	28,760	964	22,634	12	433	341,508	398,861
1931.....			1,454	29,679	460	9,920			707,817	878,487
1930.....			398	7,960	1,272	26,295	6	110	827,063	982,287
1929.....			254	5,080	2,687	55,545	6	110	948,895	1,152,160
1928.....			208	4,160	1,290	26,667			1,013,257	1,850,243
1927.....			263	6,650	3,151	65,137	11	220	829,438	1,512,015
1926.....					1,678	34,687	311	15,136	678,107	1,187,918
1925.....					1,626	33,612	439	16,723	551,230	1,070,408
1924.....			33	838	1,047	21,643	338	12,525	441,752	915,845
1923.....			130	3,250	680	13,556	256	7,906	341,705	747,934
1922.....			219	5,781	1,128	21,598	102	3,692	332,404	580,148
1921.....			341	11,268	418	8,641	153	6,990	206,831	511,883
1920.....			260	8,600	690	14,263	211	8,440	260,661	573,752
1919.....			565	11,300	850	17,571	283	9,000	163,852	250,174
1918.....			500	12,500	1,176	24,310	256	8,000	49,365	115,976
1917.....			600	18,000	2,210	45,685	375	9,875	215,472	301,261
1916.....			620	12,139	4,562	94,305	273	5,800	238,212	278,160
1915.....			317	12,119	6,636	137,180	285	5,300	298,864	339,857
1914.....			650	13,000	2,904	60,031	350	5,270	303,155	368,931
1913.....			620	12,138	2,174	44,935	350	4,900	404,801	479,515
1912.....			38	230	4,385	90,638	374	3,760	376,082	481,493
1911.....			20	122	7,781	160,854	380	3,382	353,999	406,457
1910.....			22	134	7,928	163,891	3,586	43,700	400,455	458,638
1909.....					10,193	210,711	312	3,204	245,682	364,379
1908.....			30	195	11,842	244,799	473	4,803	234,455	230,433
1907.....			30	225	13,675	282,686	551	4,480	357,411	350,859
1906.....					12,223	252,676	1,023	9,680	333,312	345,414
1905.....			300	3,600	13,707	283,353	1,020	10,200	272,252	298,248
1904.....			320	6,400	10,362	214,209	1,029	7,332	218,580	153,600
1903.....			835	16,700	25,533	527,806	1,337	9,562	189,427	173,881
1902.....			1,032	16,470	30,348	627,357	1,074	8,118	206,087	181,425
1901.....			850	15,300	26,459	546,963	358	2,200	170,100	136,947
1900.....			336	1,950	28,955	598,553	1,411	12,600	138,712	108,828
1899.....			1,000	15,000	29,876	617,604	1,378	10,300	126,754	102,055
1898.....			1,017	16,660	16,054	538,590	1,422	12,350	132,086	106,610
1897.....			15	150	27,195	562,165	1,407	17,500	155,572	121,754
1896.....			644	9,960	23,876	493,568	1,450	14,500	136,590	111,251
1895.....					21,919	453,119	1,400	14,000	156,809	133,929
1894.....					18,334	389,338	2,128	16,000	168,300	147,644
1893.....					18,436	381,095	2,112	21,000	152,754	144,111
1892.....					18,865	389,965	2,462	27,610	197,019	170,021
1891.....					21,841	451,503	1,980	19,800	161,934	153,955
1890.....					22,978	474,990	850	8,536	181,285	154,972
1889.....					24,673	510,029	712	7,128	165,025	142,850
1888.....					21,137	436,939	1,971	20,400	124,818	120,429
1887.....					20,009	413,631	1,710	25,020	116,346	116,346
1886.....					22,038	455,564	1,765	24,050	123,753	118,110
1885.....					20,945	432,971			81,887	77,898
1884.....					15,168	313,554			107,653	100,446
1883.....					14,571	301,207			145,448	132,834
1882.....					13,307	275,090			133,426	121,070
1881.....					10,147	209,755			110,303	100,284
1880.....					12,472	257,823			125,685	111,833
1879.....					12,980	268,328			95,623	71,353
1878.....					11,864	245,253			88,631	76,695
1877.....					15,925	329,205			106,950	93,867
1876.....					11,300	233,585			87,720	87,590
1875.....					10,576	218,629			86,065	86,193
1874.....					8,623	178,244			(a) 67,830	68,164
1873.....					11,180	231,122				
1872.....					12,352	255,349				
1871.....					18,139	374,972				
1870.....					18,740	387,392				
1869.....					16,855	348,427				
1868.....					19,377	400,555				
1867.....					25,763	532,563				
1866.....					23,776	491,491				
1865.....					24,011	496,357				
1864.....					18,883	390,349				
1863.....					13,180	272,448				
1862.....					6,863	141,871				
1861.....					*	*				
Total.....										

* No production recorded, or data not available by provinces.

(a) 1874-1885 inclusive—exports.

NOTE.—In 1921 there were produced 16 tons of feldspar, valued at \$117.

Table 10.—Historical Summary of the Mineral Production of Nova Scotia—Continued

—	Iron ore		Lime		Manganese ore and bog manganese		Quartz	
	tons	\$	bushels	\$	tons	\$	tons	\$
1928			352,886	110,648			4,701	8,415
1927			505,343	150,115			11,732	14,078
1926			447,543	119,230			6,764	10,819
1925			323,743	82,698			9,640	13,978
1924			254,857	67,954			7,292	12,107
1923			111,829	30,160			1,017	1,447
1922			186,657	35,534				
1921			526,571	79,418	60	2,400	3,116	6,836
1920			888,971	113,250	4	60	8,057	18,494
1919			1,200,029	154,187			11,845	31,388
1918			1,032,971	175,876			7,424	28,022
1917			873,200	100,254			4,834	16,721
1916			453,797	59,777			8,333	29,018
1915			8,243	3,464			1,352	6,760
1914			2,229	936				
1913			42,370	7,199				
1912					200	1,400		
1911					73	2,044		
1910			25,914	6,085	68	3,400		
1909			201,500	40,300	62	4,140		
1908			366,543	73,309	45	3,600		
1907	130		748,314	149,663				
1906			986,106	197,344	158	14,836		
1905			911,534	182,506	646	70,371		
1904			915,086	183,017	51	5,760		
1903			517,722	103,748	28	1,120		
1902	20,436	21,049	854,812	171,339				
1901	30,857	168,877	709,596	145,121	75	1,875		
1900	22	50	639,200	130,555	5½	300		
1899	18,134	51,330	55,750	13,490				
1898			57,730	16,729				
1897	11,802	17,620	51,068	16,102				
1896	89,839	137,161	45,000	16,000				
1895	97,820	151,386	50,000	13,600				
1894	84,952							
1893	61,293							
1892	40,335							
1891	16,172							
1890	18,619							
1889	18,940							
1888	28,000				67	2,328		
1887	19,079				11	325		
1886	23,400				15½	1,166		
1885	58,810				123½	3,975		
1884	83,792				108	6,348		
1883	89,379							
1882	102,201							
1881	78,258							
1880	53,649							
1879	49,206		217,944	44,565				
1878	54,161							
1877	42,611		29,450	6,480	67	3,947		
1876	43,532		49,400	11,442	106	6,460		
	44,388		16,000	3,800	306	21,260		
	48,129				427			
	54,885				353½			
	52,410				302½			
	42,135				150	12,462		
	39,843				205			
	51,193				231			
	29,889				223	7,931		
	36,600				145	7,170		
	16,879				127	5,505		
	15,274				97			

Nova Scotia had a production of lead in 1936 which amounted to 1,901,712 pounds valued at \$74,414 and in 1937 there were produced 418,086 pounds valued at \$21,364.

In 1917 and 1918 there was a small production of molybdenite—some 274 pounds worth \$301.

Table 10.—Historical Summary of the Mineral Production of Nova Scotia—Continued

—	Salt		Sand and Gravel		Silica Brick		Silver	
	tons	\$	tons	\$	M	\$	fine oz.	\$
1938.....	44,950	194,759	2,077,378	1,013,266	1,193	49,811	988	430
1937.....	47,865	216,401	2,992,429	1,457,266	2,926	121,146	26,990	12,113
1936.....	38,774	183,915	1,947,471	†941,366	1,922	70,570	107,642	48,576
1935.....	38,701	161,659	1,423,557	685,973	1,968	73,218	372	241
1934.....	42,886	191,917	256,572	114,597	2,159	71,215	321	152
1933.....	34,278	161,889	282,228	126,031	453	15,834	104	39
1932.....	31,897	150,708	423,487	136,677			47	15
1931.....	27,718	143,761	403,858	198,757	621	22,044	48	14
1930.....	23,058	136,226	525,683	310,407	2,040	78,259	67	26
1929.....	27,819	157,662	332,599	151,368	2,385	93,207	132	70
1928.....	19,604	118,342	296,266	111,103	1,627	69,179	77	45
1927.....	14,391	102,590	812,976	522,723	1,238	50,978	125	70
1926.....	8,165	68,781	230,307	52,952	1,358	64,461	112	70
1925.....	6,598	49,889	286,614	55,362			86	59
1924.....	4,551	37,469	306,873	60,849			44	29
1923.....	4,480	39,151	203,416	55,928				
1922.....	5,053	54,666	154,021	54,974				
1921.....	2,638	23,269						
1920.....	3,023	32,000						
1919.....	174	2,188						
1918.....								
1917.....			225,457	129,620				
1916.....			175,571	84,631				
1915.....			368,049	71,821				
1914.....								

(a) Totals of recorded figures only.
† Includes production in Prince Edward Island.

Table 10.—Historical Summary of the Mineral Production of Nova Scotia—Concluded.

	Stone								Zinc		Other Product
	Granite		Limestone		Marble		Sandstone				
	tons	\$	tons	\$	tons	\$	tons	\$	pounds	\$	\$
1938.....	5,765	31,768	20,957	34,696			36,940	80,480			
1937.....	16,430	50,966	24,398	35,914			137,893	192,218	5,485,550	268,902	
1936.....	66,507	99,855	20,860	36,365			167,205	239,109	6,180,219	204,874	
1935.....	525	23,800	8,988	19,188			202,952	578,844			
1934.....	325	12,300	105,620	135,962			17,123	23,055			
1933.....	8,145	36,675	21,514	43,911			11,790	16,043			
1932.....	3,635	18,461	9,974	27,990			21,052	40,856			
1931.....	24,895	72,009	21,684	69,415			36,602	84,208			
1930.....	7,856	38,107	79,941	88,545			64,666	193,664			
1929.....	76,742	98,357	175,981	199,384	132	2,515	11,851	75,966			
1928.....	39,360	102,295	72,350	79,320	160	2,975	9,298	29,185			
1927.....	611	36,770	68,294	75,292			3,546	8,745			
1926.....	4,884	41,738	82,753	97,255			4,678	11,799			
1925.....	14,961	54,524	84,939	73,717			2,225	6,445			
1924.....	7,554	33,021	57,069	56,323			2,912	22,480			
1923.....	17,296	54,892	118,222	102,750			3,164	19,448			4,429
1922.....	12,725	44,489	68,122	56,936			7,108	18,067			10,028
1921.....	11,822	47,101	44,269	55,436			2,832	14,065			70,028
1920.....		(b)	(b)	(b)	(b)	(b)	(b)	(b)			226,121
1919.....		(b)	(b)	(b)	(b)	(b)	(b)	(b)			145,099
1918.....		(b)	(b)	(b)	(b)	(b)	(b)	(b)			119,229
1917.....		111,529		433,987				24,005			22,000
1916.....		164,870		263,803				30,625			82,527
1915.....		79,636		255,024				33,264			
1914.....		65,727		94,239				61,124			86,121
1913.....		29,302		258,719				62,490			101,196
1912.....		28,041		275,944				20,645			53,705
1911.....		24,258		245,216				23,440			68,735
1910.....		18,291		192,919				16,425			54,981
1909.....		5,832		161,922				21,850			71,715
1908.....					(a)	(a)					216,161

(a) Included with other products.

(b) Not shown by kinds 1918-1920. Total values for all kinds of stone for those years were: 1918, \$478,721; 1919, \$413,194 and 1920, \$420,175.

In 1918 tungsten concentrates amounting to 1,063 pounds valued at \$372 were produced in Nova Scotia.

Table 10.—Historical Summary of the Mineral Production of New Brunswick

—	Clay Products	Coal (a)		Graphite		Grindstones (b)		Gypsum		Iron Ore	
	\$	tons	\$	tons	\$	tons	\$	tons	\$	tons	\$
1938.....	123,625	342,238	1,133,346	.....	.....	175	9,192	48,418	159,203	.....	.....
1937.....	123,876	364,714	1,180,611	.....	.....	288	12,139	36,906	131,727	.....	.....
1936.....	102,256	368,618	1,190,032	.....	.....	412	17,982	35,470	123,560	.....	.....
1935.....	62,478	346,024	1,129,019	.....	.....	456	21,175	30,796	105,960	.....	.....
1934.....	59,897	314,750	1,026,342	.....	.....	535	27,091	30,398	104,709	.....	.....
1933.....	46,917	312,303	1,041,744	.....	.....	277	12,051	30,391	88,500	.....	.....
1932.....	68,151	212,695	794,168	.....	.....	256	11,802	33,019	297,520	.....	.....
1931.....	143,348	182,181	748,196	.....	.....	299	12,308	58,957	451,264	.....	.....
1930.....	162,536	209,349	864,118	.....	.....	495	35,689	82,674	513,677	.....	.....
1929.....	160,006	218,706	909,169	.....	.....	1,731	103,514	70,482	485,982	.....	.....
1928.....	72,192	207,738	869,104	.....	.....	1,609	80,451	75,033	501,252	.....	.....
1927.....	87,185	203,950	885,038	.....	.....	1,860	97,197	85,293	524,550	.....	.....
1926.....	75,851	173,111	710,245	.....	.....	1,684	90,975	59,546	468,411	.....	.....
1925.....	69,473	208,012	815,367	.....	.....	1,642	79,661	71,745	408,917	.....	.....
1924.....	74,994	217,121	932,185	.....	.....	2,113	99,299	86,738	476,804	.....	.....
1923.....	62,587	276,617	1,196,772	.....	.....	1,758	72,177	104,740	564,680	.....	.....
1922.....	75,425	287,513	1,107,643	.....	.....	903	40,050	82,462	517,668	.....	.....
1921.....	66,600	187,192	920,666	.....	.....	1,098	57,077	54,030	360,220	.....	.....
1920.....	73,484	171,610	1,091,440	.....	.....	2,233	79,696	49,505	428,183	.....	.....
1919.....	52,941	166,377	735,386	.....	.....	1,737	51,516	42,409	315,656	.....	.....
1918.....	39,055	268,212	1,331,710	.....	.....	2,816	75,005	27,225	214,114	.....	.....
1917.....	51,304	189,095	708,010	.....	.....	2,148	35,879	38,556	191,631	.....	.....
1916.....	42,881	143,540	386,016	.....	.....	3,205	46,982	39,546	153,064	.....	.....
1915.....	35,780	127,391	309,612	.....	.....	2,295	30,468	74,501	184,929	3,683	8,261
1914.....	66,502	98,049	241,075	.....	.....	3,626	49,234	79,083	200,680	4,775	10,841
1913.....	62,269	70,311	166,637	.....	.....	4,487	46,425	103,954	279,395	86,416	153,820
1912.....	54,910	44,780	89,560	.....	.....	4,038	48,330	82,757	185,821	71,520	127,716
1911.....	38,000	55,781	111,562	.....	.....	4,186	49,560	93,205	115,044	31,120	69,464
1910.....	56,475	55,455	110,912	.....	.....	3,586	43,700	90,236	213,579	5,336	11,910
1909.....	65,570	49,029	98,496	.....	.....	3,963	51,460	98,716	226,975	.....	.....
1908.....	75,513	60,000	135,000	40	360	3,370	43,325	81,620	191,312	.....	.....
1907.....	57,377	34,584	77,814	.....	.....	4,863	55,896	118,106	213,638	.....	.....
1906.....	49,220	34,076	68,152	.....	.....	4,340	50,134	131,246	250,960	.....	.....
1905.....	45,010	29,400	58,800	60	480	4,520	52,175	163,553	232,586	.....	.....
1904.....	150,830	9,112	18,224	60	480	3,620	35,450	120,991	187,524	.....	.....
1903.....	150,675	16,000	40,000	.....	.....	4,201	38,740	119,182	172,080	.....	.....
1902.....	150,945	18,795	39,680	200	2,400	3,559	36,000	124,041	170,153	.....	.....
1901.....	50,229	17,630	51,857	240	2,880	4,223	42,490	121,595	189,709	.....	.....
1900.....	80,920	10,000	15,000	120	1,440	4,128	40,850	112,294	145,850	.....	.....
1899.....	85,600	10,528	15,792	.....	.....	3,133	32,965	116,792	151,296	.....	.....
1898.....	113,400	6,160	9,240	260	2,600	3,513	32,425	86,083	121,704	.....	.....
1897.....	.....	6,000	9,000	89	890	3,165	24,840	82,658	118,116	.....	.....
1896.....	.....	7,500	11,250	45	315	2,263	18,810	67,137	59,024	.....	.....
1895.....	.....	9,500	14,250	150	900	2,075	17,932	66,949	63,839	.....	.....
1894.....	.....	6,469	10,264	.....	.....	1,629	16,717	52,962	48,200	.....	.....
1893.....	.....	6,200	9,837	.....	.....	2,488	17,379	36,916	41,846	.....	.....
1892.....	52,853	6,768	9,375	.....	.....	2,821	23,577	39,709	65,707	.....	.....
1891.....	47,071	5,422	11,030	260	1,560	2,499	22,787	36,011	33,996	.....	.....
1890.....	70,430	7,110	13,850	150	1,200	4,034	33,804	39,024	30,986	.....	.....
1889.....	93,425	5,673	11,733	200	1,600	2,692	23,735	40,866	49,130	.....	.....
1888.....	34,364	5,730	11,050	150	1,200	3,793	30,729	44,369	48,764	.....	.....
1887.....	46,541	10,040	23,607	300	2,400	3,582	38,988	29,102	29,216	.....	.....
1886.....	33,218	.....	.....	500	4,000	2,255	22,495	32,421	48,632	.....	.....
1885.....	.....	.....	.....	.....	.....	.....	.....	15,140	27,730	.....	.....
1884.....	.....	.....	.....	.....	.....	.....	.....	21,800	32,751	.....	.....
1883.....	.....	.....	.....	.....	.....	.....	.....	20,242	35,557	.....	.....
1882.....	.....	.....	.....	.....	.....	.....	.....	15,597	24,581	.....	.....
1881.....	.....	.....	.....	.....	.....	.....	.....	10,310	15,025	.....	.....
1880.....	.....	.....	.....	.....	.....	.....	.....	10,375	10,987	.....	.....
1879.....	.....	.....	.....	.....	.....	.....	.....	8,791	8,791	.....	.....
1878.....	.....	.....	.....	.....	.....	.....	.....	16,335	16,435	.....	.....
1877.....	.....	.....	.....	.....	.....	.....	.....	5,030	5,030	.....	.....
1876.....	.....	.....	.....	.....	.....	.....	.....	4,925	6,616	.....	.....
1875.....	.....	.....	.....	.....	.....	.....	.....	(c) 5,420	5,420	.....	.....

(a) For the years 1919-1938 the tonnage shown is the total output from all mines. For previous years the figures given include only sales, colliery consumption and coal used by the operators.

(b) Includes pulpstones, etc.

(c) From 1875 to 1885, inclusive, the figures shown are exports.

Table 10.—Historical Summary of the Mineral Production of New Brunswick
—Continued

—	Lime		Manganese ore		Manganese bog		Mineral waters	Natural gas		Petroleum	
	bushels	\$	tons	\$	tons	\$	\$	M cu. ft.	\$	Barrels	\$
1938.....	435,629	119,556						577,492	284,689	19,276	27,246
1937.....	568,542	150,362	85	817				576,671	283,922	18,089	25,496
1936.....	509,771	128,016	221	1,596				606,246	298,819	17,112	24,075
1935.....	464,914	124,775	100	800				615,454	303,886	12,954	18,230
1934.....	450,057	126,409						623,601	306,005	11,106	22,277
1933.....	481,400	134,786						618,033	302,706	8,835	18,111
1932.....	330,629	109,184						662,452	326,191	6,408	14,332
1931.....	321,171	127,054	57	493	77	462		655,891	323,184	6,577	15,461
1930.....	357,743	135,304	269	1,296	275	1,650		661,975	325,751	6,758	17,378
1929.....	443,371	174,553			300	1,800		678,456	333,002	7,499	19,909
1928.....	321,743	130,784			385	2,237		660,981	324,344	8,043	21,391
1927.....	343,111	148,321						630,755	124,637	18,244	41,748
1926.....	477,226	196,477						648,316	128,300	10,544	29,940
1925.....	202,106	92,216						639,235	122,394	5,376	18,756
1924.....	208,180	108,890	584	4,088				599,972	113,577	5,561	21,313
1923.....	329,548	143,814						640,300	126,068	8,826	35,642
1922.....	560,834	187,895						753,898	148,040	7,778	32,732
1921.....	562,447	203,034						708,743	139,375	7,479	33,022
1920.....	701,859	365,030						682,502	130,506	5,148	19,963
1919.....	468,533	223,193						682,890	120,510	4,225	13,141
1918.....	482,548	221,935						792,396	107,842	3,009	7,402
1917.....	532,251	171,248						796,775	103,735	2,341	5,460
1916.....	424,113	104,635	(b)	(b)				610,118	79,628	1,345	2,663
1915.....	369,117	93,797	150	3,600				430,692	60,383	1,020	1,423
1914.....	391,739	102,980						425,826	54,249	1,725	2,742
1913.....	392,985	98,841						828,603	174,147	2,111	3,762
1912.....	616,835	133,742						173,903	36,549	2,679	3,799
1911.....	613,728	132,897					19,843			2,461	3,019
1910.....	470,050	105,593					16,000			1,485	1,826
1909.....	697,466	154,151					14,003				
1908.....	155,748	34,262					14,894				
1907.....	554,330	124,786									
1906.....	405,450	94,290									
1905.....											
1904.....											
1903.....											
1902.....											
1901.....											
1900.....											
1899.....											
1898.....											
1897.....											
1896.....											
1895.....											
1894.....											
1893.....											
1892.....											
1891.....	67,430	15,285									
1890.....	814,662	136,586									
1889.....	1,005,685	162,157									
1888.....	440,225	82,993									
1887.....	478,410	103,463									
1886.....	316,380	58,120									

(b) Included with other products.

Table 10.—Historical Summary of the Mineral Production of New Brunswick
—Concluded

—	Sand and gravel		Granite		Limestones		Marble		Sandstone		Other Product
	tons	\$	tons	\$	tons	\$	tons	\$	tons	\$	\$
1938.....	3,833,540	1,825,383	954	71,600	7,985	19,855			4,340	28,870	
1937.....	1,136,013	715,652	936	74,961	51,929	55,600			4,603	8,480	
1936.....	970,945	567,797	1,485	73,784	53,781	55,564			4,165	4,410	
1935.....	1,813,206	845,981	31,091	103,275	53,213	86,001			840	19,447	
1934.....	568,064	322,238	5,984	76,793	30,356	78,441			1,578	5,948	
1933.....	496,961	331,497	1,792	82,771	14,262	41,904			660	6,695	
1932.....	569,150	447,239	4,369	102,699	10,707	31,554			1,729	20,665	
1931.....	183,475	18,149	2,583	148,881	35,378	73,398			24,364	119,712	
1930.....	357,551	41,303	46,209	139,212	40,262	97,841			25,141	47,816	
1929.....	525,857	46,167	5,142	91,610	20,710	33,360			1,500	80,000	
1928.....	491,471	54,183	5,485	66,435	30,772	57,650			10,075	18,896	
1927.....	388,066	118,768	1,634	53,695	25,124	56,146			3,150	11,250	
1926.....	70,931	11,360	3,824	66,423	15,054	30,722			230	2,400	
1925.....	70,156	12,331	9,027	89,731	16,364	35,012					
1924.....	141,897	23,999	4,921	80,812	14,308	33,299					
1923.....	608,528	94,634	11,509	143,473	10,689	21,981			250	629	
1922.....	448,322	49,509	11,389	95,352					638	9,378	
1921.....	239,192	24,171	14,325	92,790					800	4,500	
1920.....	(b)	(b)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	59,472
1919.....			(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	73,933
1918.....			(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	39,217
1917.....	518,401	47,062		61,170		22,875					27,105
1916.....	803,014	120,988		59,325		6,900					46,032
1915.....	323,192	19,014		8,335							69,073
1914.....				24,525							145,177
1913.....				32,945							236,647
1912.....				22,317							70,787
1911.....				37,994		110					22,868
1910.....				6,880		315					68,260
1909.....				11,541		30					35,537
1908.....							(b)	(b)			51,793
											4,200
											85,510

(a) Not recorded by kinds.—Total stone production in 1918 was \$99,044, in 1919 it was 125,294 and in 1920 it was \$280,167.

(b) Included with other products.

NOTE.—In addition to the above items 13,440 pounds of antimony valued at \$2,688 were produced in 1915. In 1917 there were 33,920 pounds of copper valued at \$9,219 and 400 ounces of silver valued at \$326 produced. Also in 1918 tungsten concentrates amounting to 22,000 pounds valued at \$8,693 were produced.

Table 10.—Historical Summary of the Mineral Production of Quebec

	Asbestos (b)		Cement		Chromite		Clay Products	Copper	
	tons	\$	barrels	\$	tons	\$	\$	pounds	\$
1938	289,793	12,890,195	2,730,320	3,693,188			1,022,194	112,645,797	11,233,039
1937	410,025	14,505,541	2,578,623	3,537,798	210	3,286	1,053,153	94,653,132	12,378,737
1936	301,287	9,958,183	2,093,130	2,945,074	545	8,508	691,765	66,340,175	6,287,058
1935	210,467	7,054,614	1,751,012	2,472,008	346	5,371	593,162	79,050,906	6,162,350
1934	155,980	4,936,326	1,613,641	2,294,847	71	1,098	632,322	73,968,545	5,487,948
1933	158,367	5,211,177	1,517,555	2,128,900	30	343	520,088	69,943,882	5,214,177
1932	122,977	3,039,721	2,210,584	3,155,702	78	1,113	1,064,551	67,336,982	4,296,216
1931	164,296	4,812,886	4,942,323	7,092,895			2,360,908	68,376,985	5,723,154
1930	242,114	8,390,163	4,865,609	7,031,528			2,464,044	80,310,363	10,425,891
1929	306,055	13,172,581	5,169,408	7,120,374			3,187,702	55,337,169	10,019,901
1928	273,033	11,238,360	4,913,820	6,305,396			3,097,295	33,697,949	4,909,791
1927	274,778	10,621,013	4,636,751	5,383,058			2,734,738	3,119,848	403,084
1926	279,389	10,095,488	3,727,377	4,535,386			2,702,298	2,674,058	368,886
1925	290,387	8,987,459	3,365,802	5,689,991			2,426,887	2,510,141	352,474
1924	225,572	6,618,930	2,758,316	4,796,959			2,435,695	1,893,008	246,546
1923	231,476	7,519,906	3,173,993	6,347,986	3,558	52,650	2,439,598		
1922	163,706	5,552,723	2,660,935	5,907,300		767	2,494,236		
1921	92,761	4,906,230	2,135,631	5,410,275		2,798	1,744,760	352,308	44,045
1920	199,573	14,792,201	3,013,463	6,545,054	11,016	251,379	2,376,029	880,638	153,774
1919	159,236	10,975,369	2,260,422	4,340,010		8,541	1,577,576	2,691,695	503,105
1918	158,259	8,970,797	1,564,360	3,003,571	21,324	835,727	1,817,357	5,869,649	1,445,577
1917	153,771	7,228,233	2,079,625	3,274,989	36,725	499,682	983,310	5,015,560	1,363,229
1916	154,149	5,228,869	2,150,475	2,525,863	27,517	311,460	993,664	5,703,347	1,551,424
1915	136,842	3,574,985	2,390,724	2,812,797	12,341	179,543	918,425	4,197,482	725,115
1914	117,573	2,909,806	2,846,061	3,331,601	136	1,210	1,267,700	4,201,497	571,488
1913	161,086	3,849,925	2,940,211	3,430,023			1,606,816	3,455,887	527,679
1912	136,301	3,137,279	2,714,685	3,134,499			1,680,460	3,282,210	536,346
1911	127,414	2,943,108	1,614,730	1,963,439	157	2,587	1,341,467	2,436,190	301,503
1910	102,215	2,573,603	1,563,714	1,954,646	299	3,734	1,442,842	877,347	111,775
1909	87,300	2,301,775	1,011,194	1,314,550	2,470	26,604	1,153,832	1,088,212	141,272
1908	90,773	2,573,355	704,492	984,350	7,225	82,008	893,717	1,582,024	169,330
1907	90,426	2,505,042			7,196	72,901	1,214,108	1,517,990	303,659
1906	82,185	2,060,143			9,035	91,859	769,458	1,981,169	381,930
1905	68,263	1,503,259			8,575	93,301	896,000	1,621,243	252,752
1904	48,465	1,226,352			6,074	67,146	117,894	760,000	97,455
1903	41,677	929,757			3,509	51,129	1,028,246	1,152,000	152,467
1902	40,416	1,148,319			900	13,000	946,755	1,640,000	190,666
1901	40,217	1,259,759			1,274	16,744	884,166	1,527,442	246,178
1900	29,141	748,431			2,335	27,000	866,060	2,220,000	359,418
1899	25,536	485,849			2,010	21,842	828,868	1,632,560	287,494
1898	23,785	491,197			2,021	24,252	820,758	2,100,235	252,658
1897	30,442	445,368			2,637	32,474		2,474,970	279,424
1896	12,250	429,856			2,342	27,004		2,407,200	261,903
1895	8,756	368,175			3,177	41,300		2,242,462	241,288
1894	7,630	420,825			1,000	20,000		2,176,430	208,067
1893	6,331	310,156						4,468,352	480,348
1892	6,082	390,462					489,470	4,883,480	564,042
1891	9,279	999,878					500,957	5,401,704	695,469
1890	9,860	1,260,240					458,597	4,710,606	741,920
1889	6,113	426,554					278,845	5,315,000	730,813
1888	4,404	255,007					223,161	5,562,864	927,107
1887	4,619	226,976			38	570	80,117	2,937,900	330,514
1886	3,458	206,251			60	945	83,025	3,340,000	367,400
1885	2,440	142,441							
1884	1,141	75,097							
1883	955	68,750							
1882	810	52,650							
1881	540	35,100							
1880	380	24,700							
1879									
1878									
1877									
Total	6,582,556	239,067,375			188,337	3,163,867		915,266,303	100,007,818

Data for cement production are not available prior to 1908.

Cement was produced in Quebec as early as 1840.

(b) 1880 to 1886—exports.

Table 10.—Historical Summary of the Mineral Production of Quebec—Continued

—	Feldspar		Gold		Graphite		Iron Ore†		Iron Oxides Ochre	
	tons	\$	fine oz.	\$	tons	\$	tons	\$	tons	\$
1938.....	5,874	62,878	881,263	30,998,426			207	1,449	5,387	67,209
1937.....	12,285	105,612	711,480	24,894,685			4,229	26,432	5,617	77,640
1936.....	8,115	75,703	666,905	23,361,683			2,566	18,318	5,458	65,630
1935.....	7,002	63,075	470,552	16,558,725	21	1,281	2,288	16,400	5,357	75,388
1934.....	9,207	78,853	390,097	13,458,347	129	6,426	2,023	14,161	4,798	64,566
1933.....	6,183	59,283	382,886	10,950,539	43	2,222			4,192	51,965
1932.....	3,390	39,062	401,105	9,417,572					5,017	44,161
1931.....	10,381	86,842	300,075	6,471,075			1,509	10,261	5,410	48,205
1930.....	17,074	163,802	141,747	2,930,170	197	9,850	412	1,239	6,590	83,753
1929.....	15,790	133,492	90,798	1,876,961	173	12,652	2,748	7,359	6,220	113,932
1928.....	12,943	104,789	60,006	1,240,434	50	4,668	2,244	6,732	5,278	109,383
1927.....	12,730	104,618	8,331	172,217	34	2,043	2,029	8,980	5,931	102,186
1926.....	13,168	111,136	3,680	76,072	326	29,516	200	600	6,518	100,923
1925.....	11,287	94,730	1,602	33,116	359	30,900	3,978	11,934	6,985	89,173
1924.....	16,147	142,118	883	18,253	46	3,275	1,408	3,771	7,146	88,540
1923.....	12,026	102,779	667	13,788	45	2,316	69	186	9,911	123,186
1922.....	12,472	127,826			24	1,500	526	1,410	7,282	110,488
1921.....	9,737	80,180	635	13,127	38	2,423			8,879	92,765
1920.....	649	10,052	955	19,742	233	31,913	960	3,000	19,128	157,909
1919.....	925	13,073	1,470	30,388	20	400	321	1,005	11,862	113,427
1918.....	191	4,279	1,939	40,083	180	40,018	6,330	28,211	17,317	112,440
1917.....	1,188	8,204	1,511	31,235	541	106,305	16,488	48,599	9,409	87,605
1916.....	4,610	18,075	1,034	21,375	479	75,776	3,209	8,308	8,811	58,711
1915.....	572	2,005	1,099	22,720	75	5,431			6,248	48,353
1914.....	98	2,156	1,292	26,708	261	18,886			5,890	51,725
1913.....	74	1,554	701	14,491	103	9,620	5,102	26,999	5,987	41,774
1912.....	100	2,000	642	13,270	604	50,680	1,185	4,232	7,654	32,410
1911.....	17	255	613	12,672	374	33,084	3,616	6,479	3,612	28,173
1910.....	90	1,800	124	2,565	155	16,000	4,503	8,252	4,813	33,185
1909.....	97	1,719	193	3,990	134	10,176	4,150	5,508	3,940	28,096
1908.....					1	165	10,103	22,094	4,746	30,440
1907.....					120	5,000	12,748	34,956	* 5,828	* 35,570
1906.....			165	3,412	125	8,300	9,933	32,938	* 6,758	* 36,125
1905.....			191	3,940			12,681		5,105	34,675
1904.....			140	2,900	25	2,300	16,152		3,925	24,995
1903.....	18	32	180	3,712			12,035		6,266	32,760
1902.....			391	8,073	100	10,000	18,524		4,955	30,495
1901.....	534	1,068	145	3,000	220	4,400	15,489		2,233	16,735
1900.....	155	542			302	5,600	19,000		1,966	15,398
1899.....	3,000	6,000	238	4,916	90	8,000	19,420		3,919	20,000
1898.....	2,500	6,250	295	6,089	100	5,098	17,873		2,226	17,450
1897.....	1,400	3,290	44	900	247	12,350	22,436		3,905	23,560
1896.....	972	2,583	145	3,000	94	9,140	17,630		2,362	16,045
1895.....			62	1,281	70	5,250	17,783		1,339	14,600
1894.....			1,412	29,196	5	400	19,492		611	8,690
1893.....	575	4,525	759	15,696			22,076		1,070	17,710
1892.....	175	525	628	12,987	167	3,763	22,690		390	5,800
1891.....	685	3,425	87	1,800			14,380		900	17,750
1890.....	700	3,500	65	1,350	25	4,000	22,305		275	5,125
1889.....			58	1,207	42	1,560	14,533		794	15,280
1888.....			181	3,740			10,710		397	7,900
1887.....			78	1,604			13,404		485	3,733
1886.....			193	3,981					350	2,350
1885.....			103	2,120						
1884.....			422	8,720						
1883.....			860	17,787						
1882.....			827	17,093						
1881.....			2,741	56,661						
1880.....			1,605	33,174						
1879.....			1,160	23,972						
1878.....			868	17,937						
1877.....			583	12,057						
1876.....										
Total....	215,136	1,833,690	4,538,911	143,026,734	6,377	592,687	433,697		271,606	2,664,392

† Includes titanium ore.

NOTE:—2 tons of garnets \$150 were produced in 1927.

* Includes a small production from Ontario.

Table 10.—Historical Summary of the Mineral Production of Quebec—Continued

—	Kaolin		Lead		Lime		Magnesitic Dolomite		Mica		Mineral Waters (Natural)	
	tons	\$	pounds	\$	bushels	\$	tons	\$	tons	\$	imp.gal.	\$
1938					3,923,257	843,331		420,261	218	72,982	159,893	19,033
1937			1,521,182	77,732	4,466,086	909,116		677,207	546	124,594	198,319	19,697
1936			2,047,689	80,126	3,807,257	718,585		768,742	272	63,123	131,186	17,399
1935			2,047,624	64,156	3,327,800	678,866		486,084	373	74,894	126,616	15,113
1934					3,105,429	631,984		382,927	322	85,967	75,665	16,116
1933					3,152,400	647,558		360,128	256	39,060	9,024	3,094
1932					2,680,371	587,901		262,860	41	4,076	15,506	4,697
1931					3,185,600	804,218	11,411	295,579	290	30,601	19,868	4,746
1930					3,695,714	967,650	13,336	336,162	430	61,729	12,941	3,727
1929			5,358,304	270,616	4,768,343	1,264,194	18,809	491,170	1,062	72,630	12,205	2,488
1928			6,218,336	284,520	3,260,857	896,782	13,195	346,990	1,101	54,224	15,415	5,608
1927			6,496,577	341,461	3,075,819	806,665	7,337	230,309	1,454	99,194	10,330	1,813
1926			3,729,636	251,788	2,849,635	766,116	4,571	137,431	1,664	170,118	6,956	2,444
1925			2,051,100	187,060	2,542,237	673,330	5,576	122,325	2,415	178,800	7,122	2,961
1924			1,058,983	85,820	2,386,445	699,937	3,873	101,356	1,677	185,020	7,683	2,288
1923	163	2,369	520,041	37,334	2,357,928	634,213	4,801	134,382	1,545	216,684	5,421	2,408
1922	1,197	17,866			2,259,313	689,799	2,849	76,294	1,360	97,748	12,161	3,692
1921	124	1,888	595,881	34,215	2,040,451	790,503	2,927	74,109	484	41,172	19,626	7,278
1920	683	15,022	905,472	80,949	2,108,203	826,044	18,378	512,756	737	281,460	24,219	10,109
1919	759	13,744	2,280,000	158,825	1,796,822	493,762	11,273	328,465	2,429	218,437		13,257
1918	863	19,299	2,110,059	195,180	1,527,784	418,888	39,365	1,016,765	481	229,119		7,609
1917	533	9,594	1,378,001	153,468	1,470,456	335,012	58,090	728,275	774	286,730		9,201
1916	1,750	17,500	698,760	59,485	1,498,845	267,119	54,778	554,304	844	192,343	93,782	16,223
1915	1,300	13,000	40,401	2,262	1,351,306	274,831	14,779	126,584	217	50,390		18,086
1914	1,000	10,000			1,767,935	389,064	358	2,240	246	62,794		16,566
1913	500	5,000			1,616,446	418,008	515	3,335	626	125,488		30,805
1912	20	160			1,727,614	474,595	1,714	9,645	196	81,044	92,873	36,736
1911					1,428,392	356,453	991	5,531	217	69,465		63,637
1910					1,227,555	299,126	323	2,160	316	87,295		68,194
1909					1,281,827	315,633	330	2,503	128	93,298		68,565
1908					857,700	201,357	120	840	148	82,613		75,533
1907					1,053,856	262,990			318	224,197		
1906					923,563	201,816			283	159,334		
1905										109,672		
1904										76,487		
1903										74,119		
1902			420,000	17,090					66	34,304		
1901			318,052	13,784						120,000		
1900			11,200	490						106,000		
1899										133,000		
1898			221,760	8,382						106,375		
1897			177,084	6,340						26,000		
1896												
1895												
1894												
1893			3,931	146								
1892										23,000		
1891			88,665	4,857	506,700	77,462				37,000		
1890			105,000	4,704	116,593	23,274				9,590		
1889					187,220	36,831				1,496		
1888					356,646	61,489			(a)	(a)		
1887					424,316	79,137				8,276		
1886					401,700	75,700				6,991		
Total	8,892	125,442	40,403,738	2,419,790				8,997,719				569,123

* Data are not available by provinces.

(a) No record.

NOTE: One bushel of lime equals 70 pounds.

Table 10.—Historical Summary of the Mineral Production of Quebec—Continued

Year	Molybdenite		Peat		Phosphate (b)		Pyrites (Sulphur content) (c)		Quartz		Sand and Gravel	
	pounds	\$	tons	\$	tons	\$	tons	\$	tons	l	tons	\$
1933					208	1,886	16,580	98,261	85,153	315,251	12,523,404	3,532,873
1937					100	900	28,534	194,496	127,535	448,327	9,476,000	2,637,495
1936			45	255	525	4,927	43,084	282,743	78,875	320,684	5,490,280	1,418,231
1935					116	1,043	7,370	47,779	51,948	226,839	5,268,987	1,442,468
1934					81	683	4,908	50,398	57,208	229,817	3,672,582	980,454
1933			681	2,549	105	805	19,187	146,261	28,294	109,533	3,356,232	942,429
1932			762	2,286	1,316	12,333	17,954	133,838	20,123	71,045	3,458,128	893,896
1931			1,170	5,937			14,586	108,617	26,987	69,759	7,657,964	1,952,959
1930			2,219	9,330	40	760	9,926	93,038	49,561	119,668	6,581,807	1,750,690
1929	16,150	6,400	1,607	8,839	40	800	9,126	1,552	12,061	143,067	8,136,341	1,534,699
1928					91	1,126	13,021	42,795	49,141	132,532	6,203,231	1,701,282
1927					31	399	14,100	42,117	24,550	107,779	5,233,738	1,880,931
1926	20,943	10,472			40	800	12,250	36,750	6,459	30,064	2,203,196	533,850
1925	22,350	11,176			16	189	4,032	10,619	17,593	87,287	1,055,817	414,428
1924	18,739	9,370							13,376	68,936	2,197,145	206,175
1923					30	600			10,994	53,023	905,101	156,940
1922					131	1,320			5,994	29,824	700,669	110,752
1921					30	450	1,986	10,463	5,986	5,558		431,826
1920							14,817	44,451	1,986	5,558	(a)	(a)
1919	83,002	69,203	486	4,811	22	300	52,746	203,222	2,221	7,773	(a)	(a)
1918	333,318	383,315			140	1,200	124,871	507,802	1,730	5,383	998,600	265,282
1917	216,693	216,693			123	1,230	122,832	501,351	1,550	1,788	934,746	212,884
1916					190	2,340	130,639	523,272	1,149	1,436		260,983
1915					200	2,400	142,735	570,940	778			370,713
1914					554	4,875	117,698	470,792	847			638,778
1913			2,000	8,000	385	3,643	87,314	349,256	1,008	2,000		243,126
1912			500	2,000	164	1,640	60,849	243,396	556	1,240		
1911			200	800	586	4,909	39,122	247,555	548	684		
1910			70	280	1,456	12,386	24,242	102,162	805	1,006		
1909					525	4,800	35,300	130,009				
1908					598	5,900	26,598	159,588				
1907					408	3,410						
1906					600	4,500						
1905					1,300	8,425						
1904					817	4,590						
1903					1,329	8,214						
1902					856	4,953						
1901					1,033	6,280						
1900					1,270	6,090						
1899					1,279	7,674			600	1,260		
1898					632	3,160			284	570		
1897					908	3,984						
1896					570	3,420			10	50		
1895					1,822	9,565						
1894					6,861	41,166						
1893					7,650	60,076			100	500		
1892					10,231	134,964						
1891					20,244	206,416						
1890					27,172	309,980			200	1,000		
1889					27,552	287,400						
1888					20,396	219,779						
1887					19,589	264,452	36,000					
1886					19,435	288,603	34,600					
1885					28,535	490,331						
1884					20,946	415,350	42,906					
1883					19,666	427,168						
1882					16,585	302,019	2,300					
1881					9,497	182,339						
1880					11,673	175,664						
1879					6,604	101,470						
1878					9,919	195,831						
Total...	711,195	706,629	9,740	45,087	303,222	4,251,917			778,584	2,728,453		

(a) Included with other Products.

(b) 1878-1885 exports and include a quantity of Ontario phosphate cleared through Montreal.

(c) 1871-1899 tons of pyrites shipped; data 1890-1907 not recorded by provinces, 1908-1927 tonnage of pyrites shipped; 1928-1938 sulphur content of pyrites shipped.

Table 10.—Historical Summary of the Mineral Production of Quebec—Continued

Year	Selenium	Silver	STONE							
			Granite (b)		Limestone (b)		Marble (b)		Sandstone (b)	
	pounds	fine oz.	tons	\$	tons	\$	tons	\$	tons	\$
1893.....		161,675								
1892.....		191,910		126,439						52,900
1891.....		186,584		108,113						75,550
1890.....		171,545		183,357						90,825
1889.....		148,517		179,436						69,070
1888.....		149,588		139,012						65,000
1887.....		140,423		140,423						100,250
1886.....		140,598		143,006						119,160
1885.....										90,689
1884.....										89,000
Total.....	872,216	12,049,505		6,707,863						64,675

Note:—

(b) Data not available prior to 1908. (c) Data not available by kinds.

Total values for all grades were: 1918, \$952,402; 1919, \$1,441,919, and 1920, \$2,189,325.

† 1903 to 1919 inclusive quantity recorded in squares.

Table 10.—Historical Summary of the Mineral Production of Quebec—Concluded

	Talc and Soapstone		Tellurium		Zinc (a)		Other Products
	tons	\$	pounds	\$	pounds	\$	\$
1938.....		35,038	41,577	71,512	5,315,852	163,356	
1937.....		40,513	26,439	45,739	8,566,927	419,951	
1936.....		32,770	19,502	34,519	6,896,123	228,606	
1935.....		32,053	1,708	3,416	5,322,844	164,955	
1934.....		44,297					
1933.....		47,680					
1932.....		46,751					
1931.....		34,439					
1930.....		50,168			9,754,160	351,150	
1929.....		47,986			19,653,440	1,058,731	
1928.....		40,171			21,057,760	1,156,745	
1927.....	1,276	51,504			17,189,046	1,064,690	
1926.....	885	38,209			12,904,176	956,199	
1925.....	704	30,130			9,936,000	757,322	
1924.....	449	20,273			2,909,008	184,547	
1923.....	590	19,993			366,240	24,197	
1922.....	150	4,950					
1921.....							
1920.....	150	1,050			1,120,200	85,931	
1919.....					1,752,000	128,562	248,707
1918.....					2,802,928	228,691	182,902
1917.....					1,786,740	159,038	351
1916.....					1,663,200	212,956	129,275
1915.....					600,000	16,500	6,390
1914.....					1,938,000	10,017	5,180
1913.....					670,000	6,700	24,063
1912.....							
1911.....							
1910.....							
1909.....							
1908.....							959,920
1907.....							
1906.....							
1905.....							
1904.....							
1903.....							
1902.....							
1901.....							
1900.....					22,400	983	
1899.....	450	1,960					
1898.....	405	1,000			788,000	36,011	
1897.....	157	350					
1896.....	410	1,230					
1895.....	475	2,138					
1894.....	916	1,640					
1893.....	717	1,920					
1892.....	1,374	6,240					
1891.....							
1890.....	917	1,239					
1889.....	195	1,170					
1888.....	10	280					
1887.....	100	800					
1886.....	50	400					
Total.....		638,342	89,226	155,186		7,415,838	1,556,788

(a) 1898-1900, pounds of zinc contained in ore or concentrates shipped from the mines; 1913-1915, pounds of ore shipped from the mines; 1916-1938, pounds of zinc recovered by Canadian smelters and estimated recoveries by foreign smelters.

Table 10.—Historical Summary of the Mineral Production of Ontario

—	Actinolite		Arsenic		Asbestos		Barytes		Bismuth		Cement (d)	
	tons	\$	pounds	\$	tons	\$	tons	\$	pounds	\$	barrels	\$
1938			2,175,646	56,538					9,516	9,754	1,818,032	2,555,214
1937			1,389,426	41,032	1	250			5,711	5,654	2,650,652	3,657,067
1936			1,365,606	42,491					3,552	3,516	1,542,463	2,180,895
1935			2,558,789	75,326					7,079	6,796	1,243,836	1,752,148
1934	30	365	1,647,513	56,412					7,552	3,444	1,702,128	2,403,590
1933			1,468,022	56,534			20	60	7,580	3,731	1,095,845	1,587,812
1932			2,424,342	98,714					16,798	7,289	1,599,342	2,288,975
1931	35	456	3,575,936	135,170					7,331	3,532	3,470,056	5,006,826
1930	34	437	2,750,887	109,932					12,732	6,366	3,942,690	5,779,404
1929	30	375	3,742,913	154,887					27,446	23,413	4,624,712	6,608,246
1928	70	875	4,097,226	178,149					14,002	5,067	3,911,795	5,520,897
1927	86	1,075	4,961,178	197,668					2,072	1,003	3,751,786	5,144,326
1926	80	1,000	4,055,477	135,549	14	3,935			6,440	6,440	3,898,860	4,792,857
1925	40	500	2,156,441	113,324	2	901			19,667	18,566	3,462,358	5,253,911
1924	90	1,225	3,745,225	313,281	172	91,900			12,863	27,913	3,564,499	5,668,671
1923	53	583	5,158,617	582,785	6	2,600	200	4,180			3,296,428	5,855,589
1922	50	575	4,116,000	299,940							3,104,386	6,393,566
1921	78	975	2,982,000	233,763							2,723,071	6,424,356
1920	100	1,160	3,662,000	425,617							2,035,594	4,377,814
1919	80	880	5,718,000	488,706							2,023,280	3,650,585
1918	228	2,508	4,964,000	520,525			60	1,020			1,220,003	1,976,815
1917	120	1,320	5,312,000	658,231	10	2,150					1,676,904	2,267,610
1916	250	2,750	4,372,000	262,349							2,230,386	2,312,677
1915	220	2,420	4,792,000	147,830							2,407,670	2,597,807
1914	119	1,304	3,474,000	104,015							2,775,142	3,062,129
1913	66	720	3,384,000	101,463							3,992,988	4,311,183
1912	92	1,000	4,090,000	89,262							3,044,713	3,372,897
1911	67	736	4,194,000	76,237							3,090,786	3,741,039
1910	30	330	3,004,000	75,238							2,504,650	3,150,479
1909			2,258,000	64,100							2,462,027	3,084,218
1908			1,431,000	41,060							1,519,930	1,910,630
1907			660,000	36,209								
1906			402,000	14,058								
1905												
1904												
1903	550	3,108	514,000	15,420								
1902	550	4,400	1,600,000	48,000								
1901	521	3,126	1,390,000	41,676								
1900			606,000	22,725								
1899			114,000	4,872								
1898												
1897	205	1,845										
1896												
1895												
1894			14,000	420								
1893												
1892												
1891			40,000	1,000								
1890			50,000	1,500								
1889												
1888			60,000	1,200								
1887			60,000	1,200								
1886			240,000	5,460								
1885			880,000	17,600								
Totals	3,874	36,048	111,656,244	6,147,558	205	101,736	280	5,260	160,341	132,484	81,887,012	118,690,233

In 1925 Ontario produced 1,751 pounds of antimony valued at \$206 and in 1926 some 1,596 pounds worth \$281 were produced.

In 1929 4,456 pounds beryl crystals, \$114.

(d) Data not available prior to 1908; cement was produced in Ontario as early as 1867.

Table 10.—Historical Summary of the Mineral Production of Ontario—Continued

—	Chromite		Clay Products	Cobalt		Copper		Corundum		Diatomite	
	tons	\$	\$	pounds	\$	pounds	\$	tons	\$	tons	\$
1938....			2,083,496	459,226	790,913	309,030,106	30,405,500				
1937.....		39,964	2,033,845	507,064	848,145	322,039,208	41,716,364			38	1,868
1936.....		5,070	1,573,936	887,591	804,676	287,914,078	26,898,920			40	2,000
1935.....		9,576	1,370,225	681,419	512,705	252,027,928	19,295,965			100	4,600
1934.....	40	480	1,261,006	594,671	592,497	205,059,539	14,822,704			46	1,920
1933.....			1,024,579	466,702	597,752	145,504,720	10,118,847			28	1,298
1932.....			1,639,508	490,631	587,957	77,055,413	4,407,928			11	309
1931.....			3,552,800	521,051	651,179	112,882,625	9,096,463			60	840
1930.....			5,221,214	694,163	1,144,007	127,718,871	15,187,259			10	140
1929.....			6,830,162	929,415	1,801,915	88,879,853	14,622,572				
1928.....			6,177,664	954,860	1,671,900	66,607,510	8,770,149				
1927.....			5,853,035	880,590	1,764,534	45,341,295	4,946,533				
1926.....			5,356,469	664,778	1,136,014	41,312,867	4,828,964				
1925.....			5,195,084	1,116,492	2,328,517	39,718,777	5,577,311				
1924.....			5,089,299	948,704	1,682,395	37,113,193	4,833,622				
1923.....			6,270,615	888,061	2,530,974	31,656,800	4,565,227				
1922.....			6,944,218	569,960	1,852,370	10,943,636	1,464,477				
1921.....			5,183,125	251,986	755,958	12,821,385	1,602,930	403	55,965		
1920.....			5,613,488	546,023	1,365,058	32,059,993	5,596,392	196	24,547		
1919.....			4,574,796	530,371	1,325,928	24,346,623	4,550,627				
1918.....			2,434,215	1,347,544	3,368,860	47,074,475	11,593,502	137	26,112		
1917.....			2,575,304	1,079,572	1,727,315	42,867,774	11,651,461	188	32,153		
1916.....			2,145,036	840,536	924,590	44,997,035	12,240,094	67	10,307		
1915.....			2,254,863	504,212	536,268	39,361,464	6,799,693	262	33,138		
1914.....			3,979,606	889,027	571,710	28,948,211	3,937,536	548	72,176		
1913.....			5,220,467	1,642,000	420,386	25,885,929	3,952,522	1,177	137,036		
1912.....			4,864,700	1,868,000	314,381	22,250,601	3,635,971	1,960	239,091		
1911.....			3,916,575	1,704,000	170,890	17,932,263	2,219,297	1,472	161,873		
1910.....			3,667,810	2,196,000	54,699	19,259,016	2,453,213	1,870	198,680		
1909.....			3,425,841	3,066,000	94,965	15,746,699	2,044,237	1,491	162,492		
1908.....			2,476,152	2,448,000	111,118	15,005,171	1,981,883	1,089	100,398		
1907.....			3,123,372	1,478,000	104,426	14,104,337	2,821,432	1,892	177,922		
1906.....			3,136,870	642,000	80,704	10,638,231	2,050,838	2,274	204,973		
1905.....			2,696,500	236,000	100,000	8,779,259	1,368,686	1,644	149,153		
1904.....			2,306,200	32,000	19,960	4,913,594	630,070	993	109,545		
1903.....			2,402,520			7,172,533	949,285	703	77,510		
1902.....			2,149,451			7,408,202	864,278	768	84,465		
1901.....			2,222,620			8,695,831	1,401,507	387	46,415		
1900.....			2,009,915			6,740,058	1,091,215	3	300		
1899.....			1,828,936			5,723,324	1,007,877				
1898.....			1,449,536			8,375,223	1,007,539				
1897.....						5,500,652	621,023				
1896.....						3,167,256	344,598				
1895.....						4,576,337	492,414				
1894.....						5,207,679	497,854				
1893.....						3,641,504	391,461				
1892.....			1,313,877			2,203,795	254,538				
1891.....			1,076,154			4,127,697	531,234				
1890.....			1,347,278			1,303,065	205,233				
1889.....			1,182,397			1,466,752	201,678				
1888.....			1,123,671								
1887.....			1,187,453			322,524	36,284				
1886.....			881,039			165,000	18,150				
Totals.....		55,090		33,556,649	33,345,666	2,703,595,911	312,605,357	19,524	2,104,251	333	12,975

Table 10.—Historical Summary of the Mineral Production of Ontario—Continued

—	Feldspar		Fluorspar		Gold		Graphite		Gypsum†	
	tons	\$	tons	\$	fine oz.	\$	tons	\$	tons	\$
1938	8,106	65,964	217	3,906	2,896,477	101,883,578		41,590	57,503	242,470
1937	9,061	72,610	150	2,550	2,587,095	90,522,454		125,343	53,780	233,895
1936	8,409	70,840	75	900	2,378,503	83,318,960		88,812	40,191	182,783
1935	8,656	75,003	75	900	2,220,336	78,133,624	1,761	78,500	38,247	164,807
1934	7,302	61,665	150	2,100	2,105,339	72,634,195	1,389	64,998	33,234	141,389
1933	4,387	45,350	73	1,064	2,155,519	61,647,843	362	16,145	24,460	112,319
1932	3,657	42,920	32	464	2,280,105	53,534,743	346	18,483	35,655	186,175
1931	7,962	100,119	40	620	2,085,814	44,980,280	548	32,149	53,558	374,469
1930	9,722	104,667	80	1,240	1,736,012	35,886,552	1,338	86,542	94,946	776,069
1929	21,737	206,979	70	1,120	1,622,267	33,535,234	1,288	90,522	100,347	832,689
1928	18,954	180,153			1,578,434	32,629,126	1,047	52,373	85,811	553,271
1927	17,119	154,533			1,627,050	33,634,108	1,795	109,613	83,998	500,688
1926	22,783	199,102			1,497,215	30,950,180	2,401	165,344	89,987	496,059
1925	17,394	141,059	12	200	1,461,039	30,202,357	2,210	127,863	82,020	491,833
1924	28,657	216,422	76	1,343	1,241,728	25,668,795	1,288	72,842	88,121	467,097
1923	17,199	134,822	64	597	971,704	20,086,904	1,068	65,557	99,958	542,317
1922	15,255	120,576	284	3,905	1,000,340	20,678,862	573	29,853	110,227	621,668
1921	20,115	150,457	116	1,744	708,213	14,640,062	899	63,439	84,790	433,053
1920	37,224	270,843	3,758	68,475	564,995	11,679,483	1,957	133,704	74,707	404,162
1919	13,754	73,158	3,425	59,281	505,739	10,454,553	1,340	99,821	58,899	278,120
1918	18,591	108,449	7,187	150,779	411,976	8,516,299	2,934	208,852	38,214	151,564
1917	18,274	81,622	4,249	68,756	423,261	8,749,581	3,173	296,587	48,947	130,138
1916	14,878	53,332	1,284	10,238	492,481	10,180,485	3,476	249,586	36,668	116,086
1915	13,987	55,796			406,577	8,404,693	2,560	118,792	81,172	190,422
1914	17,962	68,668			268,264	5,545,509	1,386	88,317	81,219	204,033
1913	16,716	59,241			219,801	4,583,690	2,059	80,662	62,315	208,029
1912	13,633	28,916	40	240	86,523	1,788,596	1,456	66,442	53,119	176,056
1911	17,706	51,684	34	238	2,062	42,625	895	36,492	27,399	98,018
1910	15,719	45,867	2	15	3,089	63,849	1,237	58,087	15,055	67,229
1909	12,686	38,664			1,569	32,425	730	37,624	11,731	48,278
1908	7,877	21,099			3,212	66,398	210	5,040	10,380	42,456
1907	12,584	29,819			3,212	66,398	459	11,000	10,404	52,417
1906	16,948	40,890			3,202	66,193	262	10,000	2,965	24,420
1905	11,700	23,400	12	84	4,402	91,000	481	16,255	1,853	23,834
1904	11,083	22,166			1,935	40,000	367	8,980	2,390	18,350
1903	13,910	18,934			9,096	188,036	728	23,745	2,720	21,988
1902	7,576	15,152			11,118	229,828	795	15,900	1,917	7,699
1901	4,816	9,632			11,844	244,837	1,750	31,500	1,504	5,692
1900	163	570			14,391	297,495	1,500	24,000	1,095	4,331
1899					20,394	421,591	1,220	16,179	1,020	3,978
1898					12,863	265,889	300	6,000	1,087	4,201
1897					9,157	189,294	100	3,000	1,461	4,661
1896					5,563	115,000	650	13,000	3,305	7,786
1895					3,015	62,320			2,420	4,840
1894					1,917	39,624			2,369	6,187
1893					708	14,637			2,898	10,193
1892					344	7,118			4,320	5,399
1891					97	2,000			5,660	18,300
1890									6,200	8,075
1889									7,382	13,128
1888									6,700	10,200
1887					327	6,760			8,560	11,715
1886									5,826	12,000
1885									525	787
1884									688	1,254
1883									462	837
1882									1,249	1,946
1881									657	1,040
1880									875	1,240
1879									579	720
1878									489	675
1876										
1875									120	180
Totals...	544,262	3,261,143	21,505	380,759	35,656,324	936,984,063		2,989,533	1,946,158	9,755,715

† 1876 to 1885, inclusive, exports.

Garnets.. 1923—1,245 tons, value \$100,000

1924— 360 " " 7,200

Grinding pebbles—1920—560 tons, value \$...

1925 105 " " 945

1926— 64 " " 576

Table 10.—Historical Summary of the Mineral Production of Ontario—Continued

—	Iron Ore (for export)		Lead		Lime		Mica		Mineral Waters (Natural)	
	tons	\$	pounds	\$	bushels	\$	tons	\$	imp. gals.	\$
1938			22,363	748	7,727,943	1,989,259	252	6,445	28,416	2,586
1937			29,849	1,525	8,413,343	2,152,644	399	9,137	26,700	889
1936			17,442	683	7,045,514	1,946,060	529	11,433	23,100	1,117
1935			22,532	706	6,289,714	1,696,867	255	7,144	19,900	1,477
1934			21,558	525	5,548,314	1,536,289	618	9,059	21,775	1,622
1933			29,910	692	4,176,943	1,227,197	666	9,371	29,794	2,347
1932			86,477	1,828	4,762,943	1,273,230	268	2,752	61,208	2,473
1931			985,633	41,647	4,218,857	1,222,270	1,049	23,465	197,540	8,578
1930			2,193,856	116,034	7,201,886	2,177,587	740	34,275	214,200	20,754
1929			4,769,506	294,431	10,575,943	3,364,411	2,991	45,919	309,700	13,651
1928			6,814,757	402,289	7,919,600	2,467,843	2,559	32,944	253,630	27,890
1927			7,990,709	528,729	6,946,630	2,198,239	1,284	75,183	293,200	12,811
1926			7,398,795	580,730	6,522,747	2,051,446	881	59,086	208,400	27,277
1925			7,209,534	657,510	6,304,831	2,044,125	1,605	82,663	183,012	25,452
1924			5,055,368	409,687	5,419,307	1,840,152	2,414	172,252	201,670	13,133
1923	5,358	18,878	4,401,494	315,983	6,002,621	1,893,663	1,980	110,290	227,030	14,047
1922			2,890,397	180,216	4,980,183	1,767,543	1,989	54,515	209,072	10,528
1921	48	242	3,312,493	190,203	3,530,547	1,344,188	218	28,891	308,647	14,438
1920	6,683	54,266	2,255,520	201,643	5,109,635	1,962,086	1,466	94,562		14,473
1919	5,562	45,520	1,487,586	103,625	3,578,834	1,143,973	325	55,351		55,958
1918	109,942	464,188	1,684,366	155,804	2,660,791	762,976	266	42,431		145,400
1917	152,764	542,097	1,586,711	176,712	2,846,580	668,368	392	72,121		135,231
1916	137,399	385,381	685,932	58,393	2,031,396	367,115	364	62,896		110,333
1915	86,047	173,120	88,985	4,983	1,903,914	328,515	200	41,515		95,788
1914	55,635	124,459			3,393,078	556,850	349	46,267		115,215
1913	110,135	237,976	33,000	1,537	3,254,482	573,209	478	68,816		138,072
1912	14,567	28,125			3,376,193	573,269	384	62,932		131,529
1911	5,379	12,577			3,360,265	538,902	373	59,212		136,778
1910	90,979	257,781			2,988,020	476,137	442	103,090		111,369
1909	21,956	61,954			2,619,553	434,147	241	54,484		92,610
1908	216,177	528,475			2,087,731	358,507	288	57,258		61,526
1907	207,769	488,324			2,333,879	393,474	456	88,402		
1906	141,078	337,918	2,200,000	124,454	2,885,000	496,785	291	144,579		
1905	193,464		284,212	13,378	3,100,000	424,700		68,563		
1904	141,601		885,000	38,135	2,600,000	406,800		84,290		
1903	209,634		50,000	2,119	3,400,000	520,000		103,738		
1902	359,288				4,300,000	617,000	993	101,600		
1901	272,538				4,100,000	550,000		40,000		
1900	82,950				3,983,000	544,000		60,000		
1899	25,126				4,342,500	535,000		29,475		
1898	21,111				2,620,000	308,000		12,000		
1897	2,770				*	*		50,000		
1896	15,270				1,880,000	222,000		*		
1895										
1894										
1893										
1892								81,745		
1891					1,227,681	152,286		44,510		
1890					1,234,975	185,602		58,484		
1889					1,622,892	136,814		27,222		
1888	16,894				1,296,343	169,194	15	30,207		
1887	16,598				1,239,451	178,153		21,540		
1886	16,032				783,450	140,290		22,017		
Totals.	2,740,754	3,761,281	64,493,985	4,604,949	195,747,779	48,917,165		2,664,131		1,545,352

10 tons iron oxides at \$160 in 1911.

The value of Molybdenite produced to the end of 1938 totalled \$157,811, including the following outputs: 1938; 14,000 lb. value \$4,500. 1937; 16,000 lb. value \$8,147. 1931; 1,222 lb. value \$280. 1918; 42,931 lb. value \$49,371. 1917; 68,213 lb. value \$68,213. 1915; 23,300 lb. value \$25,800 and \$1,500 worth in 1914.

Table 10.—Historical Summary of the Mineral Production of Ontario—Continued

—	Natural Gas		Nephe- line Syenite	Nickel		Peat		Petroleum		Phosphate (a)	
	M cu. ft.	\$	\$	pounds	\$	tons	\$	barrels	\$	tons	\$
1938.	10,952,806	6,460,764	142,737	210,572,738	53,914,494	620	3,500	172,641	359,268		
1937.	10,746,334	6,588,798	121,481	224,790,974	59,469,423	478	2,676	165,205	356,000		
1936.	10,006,743	6,052,294	37,426	169,739,393	43,876,525	1,296	7,121	165,495	350,767		
1935.	8,158,825	4,938,084		138,516,240	35,345,103	1,340	5,761	165,041	346,156	70	60
1934.	7,682,851	4,741,368		128,687,340	32,139,425	1,878	7,343	141,355	299,874		
1933.	7,166,659	4,523,085		83,264,658	20,130,480	450	900	136,058	253,486		
1932.	7,386,154	4,719,297		30,327,968	7,179,862	2,486	5,307	130,343	247,468		
1931.	7,419,534	4,635,497		65,666,320	15,267,453	504	1,096	122,365	219,993		
1930.	7,965,761	5,034,828		103,768,857	24,455,133	628	1,602	117,302	235,746		
1929.	8,586,475	4,959,695		110,275,912	27,115,461	1,000	4,500	121,194	253,678		
1928.	7,632,800	4,535,312		96,755,578	22,318,907	1,497	5,845	134,094	249,737		
1927.	7,311,215	4,331,780		66,798,717	15,262,171			139,606	288,347	82	824
1926.	7,764,996	4,409,593		65,714,294	14,374,163			137,850	379,221		
1925.	7,143,962	3,955,006		73,857,114	15,946,672	1,370	8,394	143,134	386,555		
1924.	7,150,078	3,795,381		69,536,350	19,470,178			154,368	441,952		
1923.	8,128,413	4,066,244		62,453,843	18,332,077			159,400	478,149		
1922.	8,060,114	4,076,296		17,597,123	6,158,993	3,000	14,500	164,731	526,316	59	476
1921.	8,422,774	3,080,130		19,293,060	6,752,571	1,666	6,664	172,559	559,198		
1920.	10,529,374	2,920,731		61,335,706	24,534,282	4,550	18,650	180,071	726,286		
1919.	11,024,041	2,690,400		44,544,883	17,817,953	500	1,750	219,804	625,342	2	31
1918.	13,029,524	2,884,460		92,507,293	37,002,917			288,692	777,737		
1917.	19,868,035	3,641,587		84,330,280	33,732,112			202,991	473,477	26	256
1916.	17,953,109	2,765,105		82,958,564	29,035,497	300	1,500	196,778	389,621	13	174
1915.	15,211,523	2,622,838		68,308,657	20,492,597	300	1,050	214,444	299,149	17	102
1914.	14,094,521	2,215,808		45,517,937	13,655,381	685	2,470	212,693	338,182	400	2,400
1913.	12,474,745	2,055,768		49,676,772	14,903,032	600	2,100	225,969	402,677		
1912.	12,529,463	2,036,245		44,841,542	13,452,463	200	900	240,657	341,251		
1911.	10,863,871	1,807,513		34,098,744	10,229,623	1,263	3,017	288,631	354,054	35	297
1910.		1,271,303		37,271,033	11,181,310	771	2,324	314,410	386,724	22	192
1909.		1,145,307		26,282,991	9,461,877	60	240	420,755	559,604	473	3,254
1908.		949,297		19,143,111	8,231,538	60	180	527,987	747,102	998	8,894
1907.		746,499		21,189,793	9,535,407	50	200	788,872	1,057,088	416	2,608
1906.		533,446		21,490,955	8,948,834	474	1,422	569,753	761,760	250	1,875
1905.		316,476		18,876,315	7,550,526	80	260	634,095	856,028		
1904.		253,524		10,547,883	4,219,153	800	2,400	503,474	935,895		
1903.		196,535		12,505,510	5,002,204	1,100	3,300	486,637	1,048,874		
1902.		195,992		10,693,410	5,025,903	475	1,663	530,624	951,190		
1901.		339,476		9,189,047	4,594,523	220	600	622,392	1,008,275		
1900.		417,094		7,080,227	3,327,707	400	1,200	710,498	1,151,007	145	1,015
1899.		387,271		5,744,000	2,067,840			808,570	1,202,020	1,721	10,336
1898.		322,123		5,517,690	1,820,838			758,391	1,061,747	101	505
1897.		325,873		3,997,647	1,399,176			709,857	1,011,546		
1896.		276,301		3,397,113	1,188,990			726,822	1,155,647		
1895.		423,032		3,888,525	1,360,984			726,138	1,086,738		
1894.		313,754		4,907,430	1,870,958			829,104	835,322		
1893.		376,233		3,982,982	2,071,151			798,406	874,255	240	1,886
1892.		150,000		2,413,717	1,399,956			779,753	984,438	1,701	22,460
1891.				4,035,347	2,421,208			755,298	1,010,211	3,344	35,187
1890.				1,435,742	933,232			795,030	902,734	4,581	51,065
1889.				830,477	498,286			704,690	653,600	3,436	29,262
1888.								695,203	713,695	2,089	22,506
1887.								713,728	556,708	4,101	55,363
1886.								587,563		1,060	15,735
1885.								584,061	525,655		
1884.										* 434	5,962
1883.								571,000		* 763	8,890
1882.								472,866		* 50	500
1881.								389,573		* 568	6,338
1880.								368,987		* 2,471	36,117
1879.										* 1,887	14,422
1878.										* 1,842	20,565
1877.										* 824	12,278
1876.											
1875.											
1874.											
1873.											
1872.											
1871.											
1870.											
Total	119,489,443	301,644	2,580,157,802	746,476,549	31,101	120,435	23,798,338			35,121	387,525

(a) No record of production 1872-1877.
* Exports.

Table 10.—Historical Summary of the Mineral Production of Ontario—Continued

—	Platinum		Palladium		Other Platinum Metals		Quartz		Salt	
	Fine oz.	\$	Fine oz.	\$	Fine oz.†	\$	Tons	\$	Tons	\$
1938.....	161,310	5,196,279			130,893	3,677,342	1,173,259	597,037	388,130	1,637,140
1937.....	139,355	6,751,750			119,829	3,179,782	1,142,372	633,073	407,701	1,539,599
1936.....	131,551	5,319,922			103,671	2,483,075	884,585	216,037	350,044	1,557,078
1935.....	105,335	3,444,455			84,772	1,962,937	83,034	120,005	320,003	1,698,508
1934.....	116,177	4,488,712			83,932	1,699,282	89,838	134,572	276,751	1,734,196
1933.....	24,746	856,190			31,009	645,043	66,562	86,146	244,107	1,755,087
1932.....	27,284	1,097,021			37,613	90,890	66,135	93,574	231,138	1,789,751
1931.....	44,725	1,595,117			46,918	1,217,717	97,888	148,642	231,329	1,760,388
1930.....	34,000	1,542,172			34,040	894,511	167,487	274,674	248,637	1,558,405
1929.....	12,474	843,928			17,141	802,453	187,973	316,050	302,445	1,420,424
1928.....	10,452	704,360			13,087	605,563	194,503	308,608	279,841	1,377,629
1927.....	11,217	716,653			11,545	554,190	159,150	266,204	254,181	1,510,777
1926.....	9,471	919,349			10,024	640,178	192,733	339,304	252,345	1,388,672
1925.....	8,692	1,027,477			8,288	648,969	188,560	324,526	226,315	1,352,504
1924.....	9,181	1,090,858	8,923	811,993	593	51,120	111,645	192,855	203,428	1,337,311
1923.....	1,210	141,010	1,732	138,560	304	45,000	225,110	483,285	197,917	1,674,365
1922.....	458	44,709	724	47,060	391	31,280	81,528	118,054	176,741	1,573,657
1921.....	269	20,184	591	38,267	57	9,690	72,068	220,806	161,987	1,649,626
1920.....	578	36,961	913	58,392	513	31,815	90,433	321,063	206,832	1,512,724
1919.....	25	1,447	62	3,534			60,055	179,549	148,112	1,395,291
1918.....							216,539	474,772	131,727	1,285,039
1917.....							177,983	362,251	138,909	1,047,792
1916.....							94,519	167,636	132,903	717,653
1915.....							95,771	143,257	119,900	600,226
1914.....							52,947	83,628	107,038	493,648
1913.....							77,253	167,842	100,791	491,280
1912.....							99,686	193,976	95,053	459,582
1911.....							59,978	83,181	91,582	443,004
1910.....							87,400	90,945	84,092	409,624
1909.....							56,924	71,285	84,037	415,219
1908.....							44,741	52,830	79,975	378,798
1907.....							56,585	124,148	72,697	342,315
1906.....			314	5,652			48,376	65,765	76,720	329,130
1905.....			1,562	28,116					67,340	320,858
1904.....			952	18,564					69,477	321,778
1903.....			3,177	61,952					62,452	297,517
1902.....			4,411	86,014					64,456	292,581
1901.....									59,428	262,328
1900.....									62,055	279,458
1899.....							600	1,260	59,339	254,390
1898.....							284	570	57,142	248,639
1897.....										
1896.....							10	50		
1895.....										
1894.....										
1893.....							100	500		
1892.....										
1891.....										
1890.....							200	1,000		
Totals...	848,510	35,838,554	23,361	1,298,104	734,620	19,270,837	6,504,814	7,458,960	6,925,097	40,913,991

† Other platinum metals include palladium from 1925 to 1938.

Table 10.—Historical Summary of the Mineral Production of Ontario—Continued

—	Sand and Gravel		Selenium		Silica Brick		Silver	
	Tons	\$	Pounds	\$	M	\$	Fine oz.	\$
1938.....	8,531,281	3,046,043	54,577	94,691	595	50,592	4,318,837	1,877,701
1937.....	8,832,526	3,613,854	116,696	201,884	818	59,980	4,693,047	2,106,286
1936.....	8,498,153	2,227,620	106,300	188,151	471	26,715	5,219,366	2,355,343
1935.....	8,770,117	2,211,406	75,363	144,697	493	22,976	5,161,651	3,344,229
1934.....	7,880,959	1,821,689	51,574	91,286	369	14,730	5,321,160	2,525,470
1933.....	5,967,994	2,517,230	26,090	53,745	183	7,351	4,535,680	1,715,975
1932.....	6,994,447	1,971,239	.....	.....	93	4,304	6,335,788	2,006,648
1931.....	7,465,017	2,562,477	16,899	32,108	279	13,702	7,438,951	2,222,014
1930.....	12,027,082	3,783,830	.....	.....	378	19,120	10,205,683	3,893,876
1929.....	11,358,568	3,462,379	.....	.....	1,566	80,374	8,890,726	4,711,462
1928.....	10,389,408	2,230,307	.....	.....	1,597	86,323	7,242,601	4,213,456
1927.....	7,512,763	2,405,729	.....	.....	553	28,549	9,307,953	5,246,893
1926.....	6,483,163	2,292,678	.....	.....	1,307	66,241	9,274,965	5,760,402
1925.....	5,201,604	1,779,129	.....	.....	.....	.....	10,529,131	7,271,944
1924.....	6,174,284	2,041,959	.....	.....	.....	.....	11,272,567	7,527,933
1923.....	8,146,433	2,006,958	.....	.....	.....	.....	10,540,943	6,838,226
1922.....	6,285,123	2,184,174	.....	.....	.....	.....	10,811,903	7,300,305
1921.....	6,273,173	1,496,729	.....	.....	.....	.....	9,761,607	6,116,037
1920.....	.....	1,931,924	.....	.....	.....	.....	9,907,626	9,996,795
1919.....	(c)	(c)	.....	.....	.....	.....	12,117,878	13,465,628
1918.....	(c)	(c)	.....	.....	.....	.....	17,198,737	16,643,562
1917.....	4,283,076	1,170,052	.....	.....	.....	.....	19,301,835	15,714,975
1916.....	3,711,231	818,947	.....	.....	.....	.....	21,608,158	14,188,133
1915.....	3,033,383	727,426	.....	.....	.....	.....	22,748,609	11,302,419
1914.....	.....	.....	.....	.....	.....	.....	25,139,214	13,779,055
1913.....	.....	.....	.....	.....	.....	.....	28,411,261	16,987,377
1912.....	.....	.....	.....	.....	.....	.....	29,214,025	17,772,352
1911.....	.....	.....	.....	.....	.....	.....	30,540,754	16,279,443
1910.....	.....	.....	.....	.....	.....	.....	30,366,366	16,241,755
1909.....	.....	.....	.....	.....	.....	.....	24,822,099	12,784,126
1908.....	.....	.....	.....	.....	.....	.....	19,398,545	10,254,847
1907.....	.....	.....	.....	.....	.....	.....	9,982,363	6,521,178
1906.....	.....	.....	.....	.....	.....	.....	5,401,766	3,607,894
1905.....	.....	.....	.....	.....	.....	.....	2,451,356	1,479,442
1904.....	.....	.....	.....	.....	.....	.....	206,875	118,376
1903.....	.....	.....	.....	.....	.....	.....	17,777	9,502
1902.....	.....	.....	.....	.....	.....	.....	145,000	75,632
1901.....	.....	.....	.....	.....	.....	.....	151,400	89,250
1900.....	.....	.....	.....	.....	.....	.....	161,650	99,140
1899.....	.....	.....	.....	.....	.....	.....	202,000	120,352
1898.....	.....	.....	.....	.....	.....	.....	85,000	49,521
1897.....	.....	.....	.....	.....	.....	.....	5,000	2,990
1896.....	.....	.....	.....	.....	.....	.....	.....	.....
1895.....	.....	.....	.....	.....	.....	.....	.....	.....
1894.....	.....	.....	.....	.....	.....	.....	.....	.....
1893.....	.....	.....	.....	.....	.....	.....	.....	8,689
1892.....	.....	.....	.....	.....	.....	.....	41,581	36,425
1891.....	.....	.....	.....	.....	.....	.....	225,633	222,926
1890.....	.....	.....	.....	.....	.....	.....	158,715	166,066
1889.....	.....	.....	.....	.....	.....	.....	181,609	169,986
1888.....	.....	.....	.....	.....	.....	.....	208,064	195,580
1887.....	.....	.....	.....	.....	.....	.....	190,495	186,304
Totals.....	.....	.....	447,499	806,562	8,702	480,957	451,453,950	275,603,920

(c) Included with Other Products, data not available by provinces.

Table 10.—Historical Summary of the Mineral Production of Ontario—Continued

	STONE									
	Granite		Limestone		Marble		Sandstone		Slate	
	tons	\$	tons	\$	tons	\$	tons	\$	tons	\$
1938.....	254,917	351,941	2,242,964	1,911,841	10,537	40,694	4,662	16,220	211	2,469
1937.....	625,160	769,860	3,582,175	2,841,469	6,685	27,247	8,680	22,934	300	2,258
1936.....	492,227	582,603	2,205,992	1,773,764	4,765	29,204	3,436	10,805	260	2,080
1935.....	44,473	93,465	2,061,206	1,680,810	4,726	35,210	12,536	54,407	.....	.....
1934.....	75,526	128,386	2,370,339	1,788,107	4,331	20,556	10,104	28,458	120	600
1933.....	19,650	39,433	1,222,752	910,419	2,614	21,083	8,890	12,333	.....	.....
1932.....	73,272	186,357	1,825,793	1,419,049	2,065	40,175	4,008	9,435	.....	.....
1931.....	133,905	232,557	3,215,697	2,594,328	4,323	29,173	5,439	25,386	.....	.....
1930.....	856,124	876,110	4,524,661	3,876,527	7,345	51,085	8,103	46,806	.....	.....
1929.....	850,927	926,977	4,380,706	3,759,357	.....	.....	8,039	49,929	.....	.....
1928.....	605,275	566,601	3,967,098	3,421,064	.....	.....	9,556	53,903	.....	.....
1927.....	390,679	294,098	3,854,421	3,716,419	.....	.....	9,860	50,192	.....	.....
1926.....	398,253	359,217	3,214,544	2,742,424	586	13,755	8,659	41,892	.....	.....
1925.....	263,567	242,150	2,750,115	2,530,621	.....	.....	9,030	44,562	.....	.....
1924.....	214,691	208,219	2,614,911	2,551,111	.....	.....	10,571	30,038	.....	.....
1923.....	188,998	293,454	2,436,453	2,542,320	.....	.....	5,473	23,378	.....	.....
1922.....	185,738	412,995	2,128,769	2,547,561	.....	.....	2,758	9,370	.....	.....
1921.....	165,418	233,353	2,547,625	3,927,836	.....	.....	3,037	6,393	.....	.....
1920.....	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	.....	.....
1919.....	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	.....	.....
1918.....	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	.....	.....
1917.....	.....	119,301	.....	808,658	.....	.....	.....	64,516	.....	.....
1916.....	.....	135,826	.....	688,114	.....	.....	.....	33,083	.....	.....
1915.....	.....	140,894	.....	634,728	.....	10,927	.....	19,588	.....	.....
1914.....	.....	309,720	.....	853,906	.....	30,300	.....	59,923	.....	.....
1913.....	.....	324,062	.....	1,196,130	.....	18,238	.....	54,738	.....	.....
1912.....	.....	174,946	.....	862,052	.....	12,926	.....	59,240	.....	.....
1911.....	.....	131,816	.....	680,461	.....	25,996	.....	54,032	.....	.....
1910.....	.....	109,678	.....	722,763	.....	4,100	.....	62,247	.....	.....
1909.....	.....	42,700	.....	639,674	.....	3,441	.....	62,824	.....	.....
Totals...	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....

(a) 1918-1920, total values of all kinds of stone—1918, \$1,079,745; 1919, \$1,936,268; 1920, \$4,035,478.

Table 10.—Historical Summary of the Mineral Production of Ontario—Concluded

	Sulphur (b)		Talc (a)		Tellurium		Zinc (e)		Other Products
	Tons	\$	Tons	\$	Pounds	\$	Pounds	\$	\$
1938.....	16,897	168,970	10,853	109,810					
1937.....	14,009	140,090	12,457	123,301	6,651	11,506	120,011	5,883	
1936.....	14,152	141,520	14,461	143,701	10,197	18,049			
1935.....	13,292	132,920	13,710	138,161	14,275	28,550			
1934.....	14,598	145,980	13,934	135,978	5,130	25,599			
1933.....	8,196	81,960	15,114	142,134					
1932.....	3,332	33,320	12,064	111,585					
1931.....	6,508	65,080	11,806	122,044					
1930.....	7,277	73,855	11,664	133,213			3,527,894	127,004	
1929.....	4,579	51,516	15,463	180,492			5,516,806	297,190	
1928.....	4,974	54,100	14,925	179,187			58,724	3,226	
1927.....	463	6,077	15,138	181,981					
1926.....	371	4,912	14,882	178,986					
1925.....	685	8,799	13,678	174,116			179,545	13,685	
1924.....	11,429	44,542	10,718	130,577					
1923.....	25,134	99,716	9,531	125,124					
1922.....	11,233	39,763	12,854	178,728					
1921.....	27,785	101,306	9,967	140,390					
1920.....	148,652	618,283	21,411	162,784			13,950	1,070	
1919.....	117,011	285,832	18,542	115,795			147,692	10,838	1,192,516
1918.....	268,507	1,133,963	18,169	119,197					1,316,426
1917.....	288,058	1,080,866	15,778	76,139					
1916.....	177,552	555,523	13,051	48,575					17,956
1915.....	143,303	414,250	11,885	40,554					
1914.....	110,616	273,716	10,808	40,418					833,635
1913.....	71,252	171,925	12,250	45,980					638,771
1912.....	20,677	70,689	8,270	23,132			10	375	363,668
1911.....	43,544	118,265	7,300	22,100					408,110
1910.....	29,628	84,902	7,112	22,308			576	5,700 (c)	632,644
1909.....	29,344	92,812	4,350	10,300			895	8,950 (c)	383,875
1908.....	20,738	65,236	1,016	3,048			452	3,215 (c)(d)	319,563
1907.....			1,534	4,602			217		
1906.....			1,234	3,030			500		
1905.....			500	1,800					
1904.....			840	1,875			477,568	24,350	
1903.....			990	2,739			900,000	48,600	
1902.....			689	1,804			142,200	6,882	
1901.....			259	842					
1900.....			1,420	6,365			190,400	8,359	
1899.....			450	1,960			814,000	46,805	
1898.....			405	1,000					
1897.....			157	350					
1896.....			410	1,230					
1895.....			475	2,138					
1894.....			916	1,640					
1893.....			717	1,920					
1892.....			1,374	6,240					
1891.....									
1890.....			917	1,239					
1889.....			195	1,170					
1888.....			140	280					
1887.....			100	800					
1886.....			50	400					
Totals.....	1,653,796	6,360,688	396,933	3,403,262	36,253	83,704	621,892	6,107,164	

(a) Includes some soapstone from 1925 to 1931.

(b) 1908 to 1927, sulphur content of pyrites shipped; 1928 to 1938, sulphur content of pyrites shipped plus sulphur recovered from smelter gas.

(c) Includes sand-lime brick and sand and gravel. (d) Includes peat.

(e) 1898 to 1904, pounds of zinc contained in ores or concentrates shipped; 1905 to 1915, tons of ore or concentrates shipped; 1916 to 1938, pounds of zinc recovered by Canadian smelters and estimated recoveries by foreign smelters.

NOTE.—In 1919 Ontario produced 48 tons of strontium minerals valued at \$336, and in 1920 75 tons worth \$2,675 were produced.

Table 10.—Historical Summary of the Mineral Production of Manitoba

—	Cadmium		Cement		Clay Products	Coal		Copper		Feldspar	
	Pounds	\$	Brls.	\$	\$	Tons	\$	Pounds	\$	Tons	\$
1938.....	115,166	92,543	330,889	754,427	105,334	2,016	5,660	65,582,772	6,539,914	78	451
1937.....	164,223	269,326	328,518	745,736	95,531	3,172	7,709	44,920,835	5,874,747	.....	.....
1936.....	148,133	131,838	348,042	783,095	55,564	4,029	9,525	29,853,220	2,829,190	1,322	7,932
1935.....	266,457	604,857	74,755	3,106	7,408	38,011,371	2,963,146	2,084	6,252
1934.....	181,166	411,247	37,916	4,113	8,952	30,867,141	2,290,126	1,793	6,763
1933.....	129,540	295,351	20,966	3,880	9,214	38,163,181	2,844,989	88	484
1932.....	242,112	549,594	49,773	1,552	3,684	52,706,861	3,362,803	.....	.....
1931.....	544,160	1,267,893	122,628	1,306	3,797	45,821,432	3,835,254	.....	.....
1930.....	977,906	2,268,742	215,967	.....	.....	2,087,609	215,018	.....	.....
1929.....	1,000,258	2,350,606	362,240	.....	.....	.....	.....	.....	.....
1928.....	693,450	1,685,084	291,791	.....	.....	.....	.....	.....	.....
1927.....	551,698	1,378,121	201,464	.....	.....	.....	.....	.....	.....
1926.....	612,155	1,572,401	248,497	.....	.....	.....	.....	.....	.....
1925.....	407,395	1,037,929	173,794	.....	.....	.....	.....	.....	.....
1924.....	286,948	746,750	117,450	.....	.....	.....	.....	.....	.....
1923.....	320,218	817,664	160,134	.....	.....	.....	.....	.....	.....
1922.....	429,352	1,126,137	210,740	.....	.....	.....	.....	.....	.....
1921.....	208,982	.....	.....	.....	.....	.....	.....
1920.....	206,764	.....	.....	3,062,577	534,604	.....	.....
1919.....	131,737	.....	.....	3,348,000	625,775	.....	.....
1918.....	116,417	.....	.....	2,339,751	576,234	.....	.....
1917.....	500,302	1,283,948	114,651	.....	.....	1,116,000	303,329	.....	.....
1916.....	544,949	1,175,669	104,248	.....	.....	.....	.....	.....	.....
1915.....	427,293	794,897	93,674	.....	.....	.....	.....	.....	.....
1914.....	339,554	625,369	317,488	.....	.....	.....	.....	.....	.....
1913.....	402,131	737,046	514,358	.....	.....	.....	.....	.....	.....
1912.....	179,342	326,856	1,018,051	.....	.....	.....	.....	.....	.....
1911.....	12,127	16,068	834,428	.....	.....	.....	.....	.....	.....
1910.....	21,350	28,289	781,605	.....	.....	.....	.....	.....	.....
1909.....	18,561	21,995	559,008	.....	.....	.....	.....	.....	.....
1908.....	8,600	8,600	265,091	.....	.....	.....	.....	.....	.....
1907.....	11,234	16,851	466,432	.....	.....	.....	.....	.....	.....
1906.....	517,065	.....	.....	.....	.....	.....	.....
1905.....	588,735	.....	.....	.....	.....	.....	.....
1904.....	(a) 150,000	.....	.....	.....	.....	.....	.....
1903.....	(a) 150,000	.....	.....	.....	.....	.....	.....
1902.....	(a) 150,000	.....	.....	.....	.....	.....	.....
1901.....	20,000	.....	.....	.....	.....	.....	.....
1900.....	25,000	.....	.....	.....	.....	.....	.....
1899.....	25,000	.....	.....	.....	.....	.....	.....
1898.....	34,000	.....	.....	.....	.....	.....	.....
1897.....	*
1896.....	*
1895.....	*
1894.....	*
1893.....	*
1892.....	67,450	.....	.....	.....	.....	.....	.....
1891.....	13,300	.....	.....	.....	.....	.....	.....
1890.....	15,300	.....	.....	.....	.....	.....	.....
1889.....	19,636	.....	.....	.....	.....	.....	.....
1888.....	2,400	.....	.....	.....	.....	.....	.....
1887.....	8,125	.....	.....	.....	.....	.....	.....
1886.....	14,475	.....	.....	.....	.....	.....	.....
Total....	427,522	493,707	10,115,707	23,431,222	10,077,964	23,174	55,949	357,880,750	32,795,129	5,365	21,882

* Data not available by provinces.

(a) Includes production of Alberta and Saskatchewan.

Table 10.—Historical Summary of the Mineral Production of Manitoba—Continued

—	Gold		Gypsum		Lime		Natural Gas		Quartz		Salt	
	Fine oz.	\$	Tons	\$	Bushels	\$	M cu. ft.	\$	Tons	\$	Tons	\$
1938..	185,706	6,532,209	14,571	92,129	566,400	198,685	600	180	.....	.....	2,920	34,979
1937..	157,949	5,526,636	13,941	88,005	645,629	215,165	600	180	.....	.....	3,391	43,465
1936..	139,273	4,878,733	12,064	87,076	621,714	211,035	600	180	.....	.....	2,498	32,151
1935..	142,613	5,018,551	10,500	85,885	531,857	185,517	600	180	.....	.....	1,538	18,765
1934..	132,321	4,565,075	9,657	81,553	473,371	163,608	600	180	.....	.....	1,664	20,137
1933..	125,310	3,583,866	6,830	65,471	515,200	167,640	600	180	.....	.....	1,499	18,388
1932..	122,507	2,876,350	12,719	113,739	521,000	172,110	600	180	.....	.....	508	7,092
1931..	102,969	2,220,512	23,076	231,124	600,400	207,401	600	180	.....	.....	.....	.....
1930..	23,189	479,359	34,157	298,297	688,514	260,325	600	180	.....	.....	.....	.....
1929..	22,455	464,186	67,269	631,051	921,314	361,104	600	180	.....	.....	.....	.....
1928..	19,813	409,571	51,285	609,039	523,194	319,699	200	60	.....	.....	.....	.....
1927..	182	3,762	39,895	512,008	648,975	246,279	200	60	.....	.....	.....	.....
1926..	188	3,886	35,172	461,461	685,389	251,269	200	60	.....	.....	.....	.....
1925..	4,424	91,452	35,088	417,868	450,315	170,230	200	60	.....	.....	.....	.....
1924..	1,180	24,393	29,375	348,212	394,229	121,518	200	60	.....	.....	.....	.....
1923..	31	641	31,575	386,554	524,128	161,226	200	60	.....	.....	.....	.....
1922..	156	3,225	34,072	440,914	525,184	163,799	200	60	.....	.....	.....	.....
1921..	207	4,279	40,859	480,282	413,283	136,375	200	60	.....	.....	.....	.....
1920..	781	16,145	44,371	487,894	605,399	210,984	200	60	.....	.....	.....	.....
1919..	724	14,966	32,903	371,337	476,452	147,131	.....	.....	.....	.....	.....	.....
1918..	1,926	39,814	37,483	341,352	462,544	134,725	.....	.....	.....	.....	.....	.....
1917..	440	9,095	33,347	258,934	393,982	92,932	.....	.....	.....	.....	.....	.....
1916..	.....	.....	28,489	191,283	355,301	83,754	.....	.....	.....	.....	.....	.....
1915..	.....	.....	20,278	139,721	281,432	71,372	.....	.....	.....	.....	.....	.....
1914..	.....	.....	53,423	382,563	526,167	92,898	.....	.....	.....	.....	.....	.....
1913..	.....	.....	65,100	479,500	576,938	107,281	.....	.....	.....	.....	.....	.....
1912..	.....	.....	66,500	481,250	818,237	168,257	.....	.....	.....	.....	.....	.....
1911..	.....	.....	43,000	372,000	706,888	140,629	.....	.....	.....	.....	.....	.....
1910..	.....	.....	19,500	195,000	606,679	100,808	.....	.....	.....	.....	.....	.....
1909..	.....	.....	17,000	170,000	423,954	69,670	.....	.....	.....	.....	.....	.....
1908..	.....	.....	14,500	111,500	138,786	24,192	.....	.....	.....	.....	.....	.....
1907..	.....	.....	.....	.....	431,548	84,793	.....	.....	.....	.....	.....	.....
1906..	.....	.....	2,500	22,500	620,201	119,792	.....	.....	.....	.....	.....	.....
1905..	.....	.....	4,500	31,500	1905-1891	Nil	.....	.....	.....	.....	.....	.....
1904..	.....	.....	4,000	14,000	1890-69,550	10,700	.....	.....	.....	.....	.....	.....
1903..	.....	.....	3,160	20,510	1889-52,460	6,646	.....	.....	.....	.....	.....	.....
1902..	.....	.....	1,554	20,202	1888-57,600	8,940	.....	.....	.....	.....	.....	.....
1901..	.....	.....	600	7,800	1887-32,800	8,500	.....	.....	.....	.....	.....	.....
					1886-2,000	460	.....	.....	.....	.....	.....	.....
Total	1,184,344	36,766,706	994,313	9,529,604	17,889,014	5,397,449	7,800	2,340	173,617	241,890	14,018	174,977

(a) Rose quartz.

NOTE.—In 1935 there were produced 19,179 lb. of lead, valued at \$601; in 1937 lithium minerals valued at \$1,694 were also produced.

Table 10.—Historical Summary of the Mineral Production of Manitoba—Concluded

—	Sand and Gravel		Selenium		Silver		Stone					
							Granite		Limestone		Marble	
	Tons	\$	Lbs.	\$	Fine oz.	\$	Tons	\$	Tons	\$	Tons	\$
1938...	1,216,084	645,812	57,788	100,262	1,198,315	520,991	329	6,120	39,049	95,497		
1937...	1,380,957	551,464	43,920	75,982	905,179	406,253	138	1,796	41,053	63,432		
1936...	1,852,606	545,130	50,760	89,845	791,489	357,175	185	2,038	49,261	69,837	60	90
1935...	1,399,659	404,730	65,074	124,942	1,206,454	781,660	387	4,630	146,100	183,892	127	1,233
1934...	334,026	95,426	4,127	6,190	1,252,920	594,647	213	2,702	42,914	50,843		
1933...	288,214	108,828			1,101,578	416,758	332	2,987	32,858	71,240		
1932...	440,309	188,974			1,036,497	328,275	18	232	78,405	299,050		
1931...	871,986	294,178	3,870	7,353	836,547	249,877			152,858	636,226	390	6,423
1930...	1,253,103	453,944			94,653	36,114			146,316	1,075,485	762	9,994
1929...	1,782,085	322,430			2,644	1,401			191,506	885,826	603	9,191
1928...	1,653,929	262,006			1,763	1,026	114,000	114,000	121,864	494,217		
1927...	1,333,580	228,655			12	7			154,666	318,556		
1926...	989,581	178,059			18	11			101,571	357,884		
1925...	727,152	196,601			477	329			52,770	188,496		
1924...	359,535	81,897			140	93			54,065	93,876		
1923...	595,549	123,478			5	3			51,304	118,277		
1922...	780,231	207,415			20	14			34,356	106,638		
1921...					33	20			16,868	56,666		
1920...					15,510	15,649	(a)	(a)	(a)	(a)	(a)	(a)
1919...					20,700	23,069	(a)	(a)	(a)	(a)	(a)	(a)
1918...					13,316	12,886	(a)	(a)	(a)	(a)	(a)	(a)
1917...	638,802	289,081			7,201	5,863				301,968		
1916...	1,157,605	243,542							351	372,894		
1915...	484,244	203,666							15,654	153,113		
1914...		314,081							6,920	346,258		
1913...		197,719							1,523	382,984		
1912...		101,653							2,268	381,572		
1911...									3,643	315,782		
1910...									3,345	328,029		
1909...										328,554		
Total	6,238,769	225,539	404,574	8,485,471	3,752,121							

(a) Totals by kinds not available. Total values all kinds of stone: 1918, \$238,251; 1919, \$89,067; 1920, \$374,286.

Year	Tellurium		Zinc		Other Products
	Pounds	\$	Pounds	\$	\$
1938...	4,454	7,661	46,864,575	1,440,148	
1937...	5,124	8,865	36,221,314	1,775,569	
1936...	3,928	6,953	36,744,951	1,218,095	
1935...	340	680	51,129,980	1,584,513	
1934...			47,264,342	1,438,538	
1933...			43,516,037	1,397,082	
1932...			41,736,600	1,004,016	
1931...			35,173,749	898,338	
1930...			3,882,141	139,757	
1929...					
1928...					
1927...					
1926...					
1925...					
1924...					
1923...					
1922...					
1921...					1,047,453
1920...					2,179,341
1919...					1,340,449
1918...					294,493
1917...					
1916...					
1915...					
1914...					
1913...					
1912...					
1911...					
1910...					
1909...					
1908...					(a) 145,000
Total	13,846	24,159	342,533,689	10,896,056	5,006,736

(a) Includes building stone, etc.

NOTE.—In addition there were 177 pounds of tungsten concentrates valued at \$42 shipped in 1918.

Table 10.—Historical Summary of the Mineral Production of Saskatchewan

—	Cadmium		Clay Pro- ducts (b)	Coal*		Copper		Gold (e)		Natural Gas	
	Pounds	\$	\$	Tons	\$	Pounds	\$	Fine oz.	\$	M cu. ft.	\$
1938.....	73,630	59,166	118,713	1,022,166	1,380,416	18,156,157	1,810,532	50,021	1,759,489	90,285	34,136
1937.....	144,553	237,067	115,330	1,049,348	1,494,337	22,436,843	2,934,290	65,886	2,305,351	100,380	35,130
1936.....	111,749	99,457	95,584	1,020,792	1,463,680	14,971,609	1,418,859	48,981	1,715,805	90,839	33,985
1935.....			98,150	921,785	1,293,668	11,429,452	800,974	14,323	504,026	75,558	7,555
1934.....			90,997	909,288	1,241,130	6,618,913	491,077	5,405	186,472	13,781	4,823
1933.....			92,207	927,649	1,285,996	3,223,941	240,338	5,400	154,440		
1932.....			109,739	887,139	1,229,449			11	253		
1931.....			166,257	662,836	945,259						
1930.....			349,283	579,424	968,863						
1929.....			502,522	580,189	993,226						
1928.....			377,896	471,713	831,491						
1927.....			311,204	470,216	888,867						
1926.....			214,113	439,803	819,805						
1925.....			95,952	471,965	870,875						
1924.....			137,280	479,118	886,668						
1923.....			119,405	438,100	858,448						
1922.....			134,704	382,437	802,053						
1921.....			166,244	335,632	823,180						
1920.....			471,448	335,222	797,828						
1919.....			270,989	379,347	819,390						
1918.....			133,935	346,847	722,148						
1917.....			78,251	355,445	662,451						
1916.....			78,668	281,300	441,836						
1915.....			44,406	240,107	365,246						
1914.....			98,349	232,299	374,245						
1913.....			189,820	212,897	358,192						
1912.....			332,943	225,342	368,135						
1911.....			226,958	206,779	347,248						
1910.....			160,850	181,156	293,929						
1909.....			145,516	192,125	296,333						
1908.....			87,566	150,556	253,790						
1907.....			125,459	151,232	252,437						
1906.....			136,022	108,398	164,146						
1905.....			103,278	107,596	152,334						
1904.....			(a)	124,885	187,021						
1903.....			(a)	116,703	169,618						
1902.....			(a)	70,400	112,640						
1901.....				45,000	72,000						
1900.....				40,500	60,750						
1899.....				25,000	37,500						
1898.....				25,000	37,500						
1897.....				25,000	37,500						
1896.....				16,706	25,059						
1895.....				15,769	31,538						
1894.....				(c) 15,051	15,153						
1893.....				8,325	12,485						
1892.....			24,937	5,400	9,325						
1891.....			23,000								
1890.....			10,000	200	200						
1889.....			9,210								
1888.....			1,650								
1887.....			4,300	(d) 400	800						
1886.....			9,400								
Total....	329,932	395,690	6,062,535	16,290,587	26,536,188	76,836,915	7,786,070	190,027	6,625,841	370,843	115,629

* For the years 1919-1938 the tonnage shown is the total output from all mines; for previous years the figures given include only sales, colliery consumption, and coal used by the operators.

(a) See Manitoba.

(b) Includes production from Alberta 1886-1892.

(c) Includes a small quantity from Manitoba.

(d) From Turtle Mountain district, Manitoba.

NOTE.—In 1907 there were produced 3,700 bush. of lime valued at \$1,480; in 1912, 4,000 bush. valued at \$1,440; and in 1913, 35,000 valued at \$10,000.

In 1920 there were produced 2 tons magnesium sulphate, valued at \$103; and in 1921, 2 tons valued at \$120.

(e) Complete data relating to recovery of placer gold are not available.

Table 10.—Historical Summary of the Mineral Production of Saskatchewan
—Concluded

	Quartz		Salt		Sand and Gravel		Selenium		Silver		Sodium Sulphate	
	Tons	\$	Tons	\$	Tons	\$	Pounds	\$	Fine oz.	\$	Tons	\$
1938	116,898	40,914			1,037,753	662,511	28,612	49,642	898,413	390,603	62,920	552,180
1937	95,809	33,533			822,447	470,343	28,080	48,578	821,818	368,840	79,804	617,548
1936	76,089	49,458			716,910	284,531	25,380	44,923	642,497	289,940	75,598	552,681
1935	77,177	59,069	101	2,046	502,732	171,170	19,567	37,569	201,608	130,622	44,817	343,704
1934	92,447	88,748	452	8,703	533,575	169,033	459	689	87,551	41,552	66,821	587,986
1933	59,506	59,506	231	4,510	104,400	19,731			114,604	43,558	50,080	485,416
1932					362,841	66,942			14	4	22,466	271,736
1931					1,388,594	396,707					44,957	421,097
1930					3,680,553	751,779					31,571	293,847
1929					3,496,679	687,646					5,018	64,112
1928					2,225,524	431,475					6,016	68,804
1927					1,517,901	263,100					5,659	11,319
1926					863,901	145,296					6,775	13,550
1925					579,901	88,805					3,876	19,380
1924					702,713	97,045					1,083	6,004
1923					438,319	59,541					7,133	10,189
1922					924,944	306,733					504	11,980
1921			33	790							623	18,850
1920											811	19,496
1919											15	450
1918												
1917					943,970	112,275						
1916					328,116	60,079						
1915					111,919	38,206						
1914						222,019						
1913						236,377						
1912						255,453						
1911												
Total	517,926	331,228	817	16,049		5,996,797	102,098	181,401	2,766,505	1,264,919	510,147	4,370,389

Year	Tellurium		Volcanic Dust		Zinc		Other Products
	Pounds	\$	Tons	\$	Pounds	\$	\$
1938	2,206	3,794			29,962,597	920,751	
1937	3,276	5,667			32,750,910	1,605,449	
1936	1,964	3,476			27,692,869	918,019	
1935	102	204			8,974,720	278,126	
1934			1	20	2,162,938	65,831	
1933			118	2,360	2,789,683	89,563	
1932			180	3,600			
1931			128	2,560			
1930			242	4,840			
1929			300	6,000			
1928			485	9,795			
1927			105	735			
1926			90	630			
1925			160	1,380			
1924			245	1,103			
1923							
1922							
1921							105,036
1920							491,718
1919							415,402
1918							158,572
1917							
1916							
1915							
1914							
1913							
1912							
1911							(a) 64,700
1910							(a) 43,349
1909							(a) 15,591
1908							(a) 71,856
Total	7,548	13,141	2,054	33,023	104,333,717	3,877,739	1,366,224

(a) Includes sand-lime brick, etc.

Table 10.—Historical Summary of the Mineral Production of Alberta

	Bituminous Sands		Cement		Clay Products	Coal*		Gold		Lime	
	tons	\$	brls.	\$	\$	tons	\$	fine oz.	\$	bush.	\$
1938.....	(d)	(d)	304,373	611,790	377,337	5,251,233	13,698,470	305	10,728	344,371	107,012
1937.....	35	142	267,106	531,541	338,638	5,562,839	14,563,911	46	1,610	304,314	93,478
1936.....			243,534	482,197	315,777	5,696,960	14,659,705	109	3,818	260,829	78,259
1935.....	40	160	219,555	436,914	326,679	5,462,894	14,094,795	150	5,279	185,114	57,108
1934.....	862	3,449	163,946	326,253	246,677	4,763,810	12,556,099	393	13,558	213,000	65,697
1933.....	466	1,662	149,206	299,530	198,373	4,718,788	12,307,258	324	9,267	214,314	62,037
1932.....	343	1,372	193,571	399,922	329,584	4,870,648	13,526,309	83	1,949	189,771	56,577
1931.....	1,015	4,060	626,483	1,286,080	529,716	4,564,015	13,342,675	195	4,205	146,229	46,785
1930.....	2,067	8,268	525,289	1,144,160	997,685	5,755,528	18,063,225			146,743	49,525
1929.....	989	3,956	808,796	1,770,786	1,342,427	7,150,693	22,928,182	5	103	219,457	79,569
1928.....	94	374	834,067	1,732,582	1,162,264	7,336,330	25,532,414	68	1,406	190,629	69,588
1927.....	2,706	10,824	601,699	1,303,880	889,358	6,934,162	21,982,058	42	868	130,596	46,947
1926.....	528	2,112	423,766	873,621	804,933	6,503,705	20,886,103			108,309	39,517
1925.....	1,148	4,594	395,857	913,529	618,860	5,869,031	20,021,484			98,938	39,852
1924.....	531	2,127	416,534	945,700	540,477	5,189,729	18,884,318			90,214	36,279
1923.....			318,756	740,940	590,565	6,854,392	28,018,303			87,753	37,999
1922.....			358,209	838,208	700,063	5,990,911	24,351,913			130,627	71,323
1921.....			(c)	(c)	710,477	5,909,217	27,246,514	49	1,013	107,083	48,332
1920.....			(c)	(c)	786,430	6,907,765	30,186,933			139,433	72,477
1919.....			(c)	(c)	571,949	4,933,660	18,205,205	24	500	109,067	41,276
1918.....			200,401	528,672	381,074	5,972,816	20,537,287	27	558	80,408	44,141
1917.....			259,423	567,969	309,991	4,736,368	14,153,685			104,540	35,516
1916.....			275,727	477,832	225,140	4,559,054	11,386,577	82	1,695	78,019	20,033
1915.....			233,648	415,009	115,696	3,360,818	8,283,079	195	4,026	74,152	14,445
1914.....			641,395	1,212,342	462,199	3,683,015	9,350,392	48	992	280,252	58,321
1913.....			956,169	1,947,933	893,408	4,014,755	10,418,941			465,250	115,355
1912.....			821,165	1,775,898	1,356,184	3,240,577	8,113,525	73	1,509	704,035	166,520
1911.....			512,176	1,241,535	1,052,751	1,511,036	3,979,264	10	207	434,038	100,407
1910.....			323,009	774,473	753,232	2,894,469	7,065,736	89	1,850	303,214	69,268
1909.....					442,486	1,994,741	4,838,109	25	525	281,125	67,350
1908.....					240,384	1,685,661	4,127,311	50	1,037	135,000	34,500
1907.....					353,672	1,591,579	3,836,286	33	675	173,040	41,225
1906.....					150,217	1,246,360	2,614,762	39	800	240,000	56,200
1905.....					191,287	931,917	1,993,915	121	2,500		
1904.....						661,732	1,404,524	24	500		
1903.....						495,893	1,117,541	48	1,000		
1902.....						402,819	960,601	484	10,000		
1901.....						340,275	850,687	726	15,000		
1900.....						311,450	778,625	242	5,000		
1899.....						309,600	774,000	726	15,000		
1898.....						315,088	787,720	1,209	25,000		
1897.....						242,163	630,408	2,419	50,000		
1896.....						209,162	581,832	2,661	55,000		
1895.....						169,885	382,526	2,419	50,000		
1894.....						184,940	473,827	726	15,000		
1893.....						230,070	586,260	466	9,640		
1892.....						178,970	460,605	508	10,506		
1891.....						174,131	437,243	266	5,500		
1890.....						128,753	198,298	193	4,000		
1889.....						97,364	179,640	967	20,000		
1888.....						115,124	183,354	58	1,200		
1887.....						74,152	157,577	102	2,100		
1886.....						43,220	81,112				
Total					19,335,990	162,324,272	506,781,123	16,829	365,124	6,772,864	2,022,923

(c) Included in other products.

(d) Now included under petroleum refining.

* For the years 1919-1938 the tonnage shown is the total output for all mines; for previous years the figures recorded include only sales, colliery consumption and coal used by operators.

Table 10.—Historical Summary of the Mineral Production of Alberta—Continued

—	Natural Gas		Petroleum		Salt		Sand and Gravel		Silver*	
	M cu. ft.	\$	brls.	\$	tons	\$	tons	\$	fine oz.	\$
1938.....	21,822,108	4,807,346	6,751,312	8,775,094	4,045	46,035	792,760	525,175	23	10
1937.....	20,955,506	4,766,437	2,749,085	4,961,002			711,966	312,687	4	2
1936.....	17,407,820	4,376,720	1,312,368	3,019,930			894,380	339,928	9	4
1935.....	16,060,349	4,113,436	1,263,510	3,102,227			653,511	146,092	16	10
1934.....	14,841,491	3,707,276	1,253,966	3,104,823			650,232	196,898	35	17
1933.....	15,352,811	3,886,263	995,832	2,844,157			281,122	85,577	32	12
1932.....	15,370,968	3,853,794	906,751	2,751,541			734,067	250,025	9	3
1931.....	17,798,698	4,067,893	1,413,631	3,976,220			1,050,988	313,616	29	9
1930.....	20,748,583	4,929,226	1,398,160	4,780,696			1,626,989	433,221		
1929.....	19,112,931	4,684,247	988,675	3,458,177			1,721,930	447,993		
1928.....	14,288,605	3,754,466	482,047	1,764,172	100	1,300	2,575,708	489,406	7	4
1927.....	13,434,621	3,586,533	318,741	1,185,948	2,037	22,696	1,392,752	293,674	4	3
1926.....	10,794,697	3,019,221	216,050	902,504	833	8,304	1,754,965	412,430		
1925.....	9,119,500	2,752,545	183,491	845,394			534,892	107,436		
1924.....	7,131,086	1,796,618	844	4,135			615,594	115,969		
1923.....	7,191,670	1,692,246	1,943	8,227			888,216	199,256		
1922.....	5,868,439	1,622,105	6,559	52,128			1,139,961	229,091		
1921.....	4,945,884	1,374,599	7,203	49,313			(b)	(b)		
1920.....	5,633,442	1,181,345	11,032	75,986			(b)	(b)		
1919.....	8,230,838	1,365,127	16,437	97,841			(b)	(b)		
1918.....	6,318,389	1,358,638	13,040	100,004			(b)	(b)		
1917.....	6,744,130	1,299,976	8,500	63,302			709,745	71,216		
1916.....	6,904,231	1,113,296	(a)	(a)			467,500	67,142		
1915.....	4,481,947	1,022,814	(a)	(a)			390,617	47,197		
1914.....	7,172,157	1,214,670	387	2,200				273,115		
1913.....	7,174,490	1,079,466						265,165		
1912.....		289,906						148,704		
1911.....		110,165								
1910.....		75,168								
1909.....		61,722								
1908.....		63,363								
1907.....		68,533								
1906.....		50,077								
1905.....		63,085								
1904.....		74,852								
1903.....		5,675								
Total...	73,288,849	20,299,564	45,925,021		7,015	78,335				

* Data not available prior to 1927.

(a) Small output but no record.

(b) Included with other products.

Table 10.—Historical Summary of the Mineral Production of Alberta—Concluded

	Limestone		Sandstone		Other Products
	tons	\$	tons	\$	\$
1938.....	1,691	6,148			
1937.....	13,182	24,935	43	2,254	
1936.....	13,876	26,188	40	3,200	
1935.....	2,242	6,981			
1934.....	2,737	8,104			
1933.....	1,472	4,317	78	4,500	
1932.....	1,428	2,985			
1931.....	2,429	5,842	67	3,800	
1930.....	7,786	17,236	117	4,500	
1929.....	4,975	12,046	208	12,500	
1928.....	4,852	15,240	158	9,500	
1927.....	3,367	7,830			
1926.....	3,545	5,826	214	8,064	
1925.....	3,979	6,868			
1924.....	16,418	16,762	280	2,555	
1923.....					
1922.....			554	7,300	
1921.....			2,962	13,750	1,118,231
1920.....	(a)	(a)	(a)	(a)	1,575,569
1919.....	(a)	(a)	(a)	(a)	702,999
1918.....	(a)	(a)	(a)	(a)	152,444
1917.....		672		6,810	† 2,695
1916.....		257			
1915.....				890	
1914.....				60,272	2,200
1913.....		20,000		136,984	
1912.....				81,391	
1911.....				158,344	
1910.....				240,858	(b) 84,893
1909.....				90,383	(c) 614,222
1908.....					(d) 690,410
Total.....					4,943,663

† Includes a small value for copper, zinc and silver.

(a) Data by kinds not available; total values of all kinds of stone produced were: 1918—\$569; 1919—\$3,189; 1920—\$4,415.

(b) Includes lime and sand-lime brick.

(c) Includes cement, lime, etc.

(d) Includes cement, lime, stone, etc.

Table 10.—Historical Summary of the Mineral Production of British Columbia

—	Arsenic		Bismuth		Cadmium		Cement		Chromite		Clay Products
	lb.	\$	lb.	\$	lb.	\$	brls.	\$	tons	\$	\$
1938					510,342	410,090	335,488	626,731			365,132
1937					436,431	715,747	344,072	623,725			349,640
1936			360,613	357,007	526,034	468,170	281,549	516,931			280,891
1935			6,718	6,449	580,530	441,203	167,226	314,116			216,636
1934			246,092	297,771	293,611	95,665	122,345	232,009			194,437
1933			70,723	77,795	246,041	78,733	115,286	225,342			174,205
1932			57	51	65,425	26,824	253,112	536,528			216,355
1931			110,876	154,118	323,139	180,958	578,636	1,172,549			498,505
1930	1,773,333	19,595			456,582	337,871	721,044	1,489,233			687,516
1929	1,487,175	16,433	166,883	283,701	773,976	675,294	680,907	1,487,223	126	900	866,427
1928	1,334,997	14,903			491,894	341,374	670,796	1,495,204			706,039
1927	1,231,790	13,611					523,931	1,182,552			679,788
1926	1,019,200	11,262					544,863	1,239,018			592,495
1925	1,277,696	16,978					485,185	1,151,344			523,931
1924	495,250	19,768					472,327	1,240,331			460,594
1923	1,217,970	41,780					795,637	1,302,482			426,138
1922	1,036,000	21,097					391,090	1,173,270			447,452
1921							†				415,869
1920	1,256,000	22,231					†				596,172
1919	1,060,000	21,218					†				293,478
1918	2,156,000	43,114					106,415	283,497	670	31,395	357,921
1917	260,000	11,200					207,587	438,009			334,685
1916							285,679	436,459			292,698
1915							309,436	526,042			229,763
1914							491,151	833,606			413,909
1913							574,258	980,560			684,904
1912							511,539	767,038			996,568
1911							401,000	601,500			675,505
1910											562,360
1909											470,402
1908											344,446
1907											306,137
1906											123,277
1905											98,886
1904											158,874
1903											152,748
1902											76,313
1901											101,996
1900											105,000
1899											109,000
1898											100,000
1897											*
1896											*
1895											*
1894											*
1893											*
1892											129,234
1891											79,475
1890											67,201
1889											62,317
1888											42,532
1887											19,480
1886											41,150
Total.	15,605,411	273,190	961,962	1,176,892	4,704,005	3,771,929	10,370,559	20,875,299	796	32,295	16,128,481

*Data not available by provinces.

†Included with other products.

Table 10.—Historical Summary of the Mineral Production of British Columbia
—Continued

—	Coal (a)		Copper		Diatomite		Fluorspar		Gold	
	tons	\$	lb.	\$	tons	\$	tons	\$	fine oz.	\$
1938.....	1,440,287	5,237,077	65,759,265	6,557,514	14	362			605,617	21,302,578
1937.....	1,598,843	5,863,849	45,797,988	5,989,461	124	1,346			505,857	17,699,936
1936.....	1,489,171	5,493,425	21,169,343	2,006,219	10	350			451,938	15,831,388
1935.....	1,331,287	5,043,510	38,478,043	2,969,525	57	1,890			391,633	13,781,565
1934.....	1,485,969	5,351,108	48,246,924	3,579,583	6	180			296,196	10,218,762
1933.....	1,382,272	5,306,287	43,146,724	3,216,502	14	410			238,995	6,835,257
1932.....	1,681,490	6,392,801	50,580,104	3,227,111	47	440			199,004	4,672,429
1931.....	1,876,406	7,150,996	65,223,348	5,459,194	66	2,270			160,069	3,451,865
1930.....	2,083,818	8,421,572	93,318,885	12,114,657	146	5,147			164,331	3,397,023
1929.....	2,490,378	10,160,789	103,903,738	18,772,778	175	5,250	17,800	267,000	154,204	3,187,680
1928.....	2,804,954	11,094,353	102,283,210	14,902,664	160	4,800			196,617	4,064,434
1927.....	2,746,243	10,934,777	91,686,297	11,845,870					183,094	3,784,889
1926.....	2,613,719	10,612,915	89,108,017	12,292,450					225,866	4,669,065
1925.....	2,742,252	11,720,373	69,221,600	9,720,097			3,874	19,034	219,227	4,531,824
1924.....	2,193,667	10,601,998	65,451,246	8,524,370					245,719	5,079,462
1923.....	2,823,306	13,813,520	55,224,737	7,963,959			75	1,135	200,140	4,137,261
1922.....	2,927,033	14,622,317	31,936,182	4,273,700			4,219	98,233	207,370	4,286,718
1921.....	2,890,291	15,676,774	34,447,127	4,306,580			5,403	134,523	150,792	3,117,147
1920.....	3,095,011	18,105,814	45,319,771	7,911,019			7,477	171,971	124,808	2,580,010
1919.....	2,649,516	13,512,532	44,502,079	8,317,884			1,638	38,556	167,252	3,457,406
1918.....	2,568,589	11,494,681	62,865,651	15,482,560			175	5,250	180,163	3,724,300
1917.....	2,433,888	8,235,716	57,730,959	15,691,275					133,742	2,764,693
1916.....	2,584,061	8,075,190	63,642,550	17,312,046					219,633	4,540,216
1915.....	2,065,613	6,455,041	56,692,988	9,793,714					273,376	5,651,184
1914.....	2,239,799	6,999,374	41,219,202	5,606,636					252,730	5,224,393
1913.....	2,714,420	8,482,562	45,791,579	6,991,916					297,459	6,149,027
1912.....	3,208,997	10,028,116	50,526,656	8,256,561					251,815	5,205,485
1911.....	2,542,532	7,945,413	35,279,558	4,366,198					238,496	4,930,145
1910.....	3,330,745	10,408,580	35,270,006	4,492,693					261,386	5,403,318
1909.....	2,606,127	8,144,147	35,658,952	4,629,245					250,320	5,174,579
1908.....	2,333,708	7,292,838	37,041,115	4,892,390					286,858	5,929,880
1907.....	2,364,898	7,390,306	* 40,832,720	8,168,177					236,216	4,883,020
1906.....	2,146,262	5,748,915	* 42,990,488	8,287,706					269,856	5,579,039
1905.....	1,945,452	5,211,030	* 37,692,251	5,876,222					285,529	5,902,402
1904.....	1,862,625	4,989,174	* 35,710,128	4,579,110					275,975	5,704,908
1903.....	1,676,581	4,490,844	* 34,359,921	4,547,735					284,108	5,873,036
1902.....	1,808,441	4,844,040	* 29,636,057	3,445,488					288,383	5,961,409
1901.....	1,919,488	5,141,487	* 27,003,746	4,448,896					257,292	5,318,703
1900.....	1,791,833	4,799,553	* 9,977,080	1,615,289					228,916	4,732,105
1899.....	1,431,101	3,833,307	* 7,722,591	1,359,948					203,295	4,202,473
1898.....	1,263,680	3,384,858	* 7,271,678	874,783					142,215	2,939,852
1897.....	1,019,390	2,730,510	* 5,325,180	601,213					131,805	2,724,657
1896.....	1,003,769	2,688,666	* 3,818,556	415,459					86,504	1,788,206
1895.....	1,058,045	2,834,049	* 952,840	102,526					61,289	1,266,954
1894.....	1,112,628	2,980,254	* 324,680	31,039					25,664	530,530
1893.....	1,093,980	2,930,304							18,360	379,535
1892.....	937,218	2,510,406							19,327	399,525
1891.....	1,130,227	3,027,528							20,792	429,811
1890.....	767,586	2,056,035							23,918	494,436
1889.....	636,439	1,704,747							28,489	588,923
1888.....	539,467	1,445,001							29,834	616,731
1887.....	486,142	1,302,165							33,558	693,709
1886.....	375,415	1,005,576							43,714	903,651
1885.....	372,987	999,072							34,527	713,738
1884.....	441,130	1,181,598							35,612	736,165
1883.....	240,075	643,059							38,422	794,252
1882.....	323,201	865,716							46,154	954,085
1881.....	257,056	688,542							50,636	1,046,737
1880.....	305,045	817,086							49,044	1,013,827
1879.....	260,277	697,170							62,407	1,290,058
1878.....	213,750	572,544							61,688	1,275,204
1877.....	156,455	419,076							77,796	1,608,182
1876.....	157,007	420,555							86,429	1,786,648
1875.....	109,361	292,932							119,724	2,474,904
1874.....	90,788	243,183							89,233	1,844,618
1873.....									63,166	1,305,749
1872.....	166,274	593,836							77,931	1,610,972
1871.....									87,048	1,799,440
1870.....	33,424	119,372							64,675	1,338,956
1869.....	40,098	143,208							85,865	1,774,978
1868.....	49,286	176,020							114,792	2,372,972
1867.....	34,988	124,956							120,012	2,480,868
1866.....	(b) 214,410	765,748							128,779	2,662,106
1865.....									168,887	3,491,205
1864.....									180,722	3,735,850
1863.....									189,318	3,913,563
1862.....									128,528	2,656,903
1861.....									128,973	2,666,118
1860.....									107,806	2,228,543
1859.....									78,129	1,615,072
1858.....									34,104	705,000
Total....	104,810,311	375,490,873	2,010,741,790	295,849,962	819	22,445	40,661	735,702	13,240,183	308,592,247

NOTE.—In 1928 1,730 lbs. of cobalt was produced, valued at \$420.

*Metal content of ores shipped as published by British Columbia Department of Mines.

(a) The tonnage shown for 1919-1938 inclusive is the total output from all mines. For previous years the figures include only sales, colliery consumption and coal used by operators.

(b) 1836-1866 inclusive.

Table 10.—Historical Summary of the Mineral Production of British Columbia
—Continued

—	Gypsum		Iron Ore		Iron Oxides		Lead		Lime		Magnesium Sulphate	
	tons	\$	tons	\$	tons	\$	lb.	\$	bush.	\$	tons	\$
1938..	17,451	100,080			434	4,560	413,706,307	13,834,339	561,571	174,161	470	9,400
1937..	15,764	108,478			580	6,000	403,589,913	20,623,445	792,543	154,037	727	14,456
1936..	14,078	77,258			396	4,000	376,645,367	14,738,133	690,257	134,785	654	13,712
1935..	7,618	52,335			159	1,687	336,784,326	10,552,059	457,257	99,960	340	7,965
1934..	9,661	48,081			161	1,600	344,467,138	8,392,597	562,486	153,856	42	1,100
1933..	5,107	46,004			165	1,485	263,345,776	6,298,178	591,914	162,928	120	3,360
1932..	10,728	84,084			223	2,000	252,007,574	5,326,432	490,057	160,001		
1931..	20,544	176,173			110	1,000	261,902,236	7,097,812	852,171	277,269		
1930..	32,128	248,458			6	120	321,803,725	12,637,232	1,043,343	335,057		
1929..	24,696	243,814			298	2,000	307,999,153	15,555,189	1,131,171	510,592		
1928..	20,982	229,843			136	1,815	317,722,146	14,537,377	1,004,257	473,996		
1927..	24,493	201,754			194	1,350	292,770,544	15,388,020	688,890	376,683		
1926..	20,916	156,964			108	920	266,812,461	18,012,509	728,633	416,882		
1925..	240	865			133	2,740	242,454,502	22,111,850	649,858	364,435		
1924..	30	150	28		120	2,620	168,467,628	13,652,617	636,348	370,829		
1923..	323	1,615	243	1,215	513	6,450	99,541,818	7,146,107	690,971	388,494	121	6,580
1922..	100	500	1,255	3,528	3	120	87,093,266	5,430,265	516,830	284,641	1,021	24,017
1921..	40	100	1,010	3,030	169	845	60,298,603	3,462,3-6	199,341	252,630	2,029	39,506
1920..			1,212	7,272			32,792,725	2,931,670	561,305	341,632	1,947	39,886
1919..			1,200				40,060,113	2,790,587	351,253	187,963	738	9,115
1918..			2,200	6,600			47,594,328	4,402,475	401,562	143,697	1,949	14,565
1917..	10	20					29,483,725	3,283,602	232,955	58,067	929	4,645
1916..							39,157,701	3,333,496	194,042	66,301		
1915..							45,377,064	2,541,116	152,237	49,725		
1914..							36,289,845	1,625,422	151,689	56,767		
1913..	200	1,300					37,626,899	1,753,037	362,571	115,365		
1912..							35,763,476	1,597,554	517,329	181,905		
1911..	780	1,875					23,784,969	827,717	351,014	117,756		
1910..							32,987,508	1,216,249	196,878	72,657		
1909..							45,857,424	1,692,139	231,269	75,076		
1908..							43,195,733	1,814,221	176,435	44,027		
1907..			2,500				47,738,703	2,542,086	159,963	49,847		
1906..							52,408,217	2,964,733	106,192	26,694		
1905..							56,580,703	2,663,254				
1904..							36,646,244	1,579,086				
1903..			2,290				18,089,283	766,443				
1902..			10,019				22,536,381	917,005				
1901..			7,000				51,582,906	2,235,603				
1900..			1,110				63,158,621	2,760,031				
1899..			2,071				21,862,436	977,250				
1898..			280				31,693,559	1,198,017				
1897..			2,099				38,841,135	1,390,513				
1896..			196				24,199,977	721,159				
1895..			1,222				16,461,794	531,716				
1894..			1,120				5,703,222	187,636				
1893..			1,325				2,131,092	79,490				
1892..			2,300				808,420	33,064				
1891..			950									
1890..									30,000	8,000		
1889..			15,487				165,100	6,488	60,000	15,200		
1888..			8,372				674,500	29,813	13,000	3,900		
1887..			2,796				204,800	9,216	10,080	2,688		
1886..			3,941						4,000	2,500		
Total.	225,889	1,779,751	72,226		3,908	41,312	5,798,871,086	266,198,395	16,551,672	6,711,003	11,087	188,307

NOTE.—There was a production of 803 tons of magnesite, valued at \$7,211 in 1921; and in 1916, 635 tons, valued at \$9,525.

Table 10.—Historical Summary of the Mineral Production of British Columbia
—Continued

—	Manganese Bog		Mercury (a)		Mica*		Mineral Waters	Natro-Alunite		Phosphate	
	tons	\$	lb.	\$	lb.	\$	\$	tons	\$	tons	\$
1938.....			760	760	96,250	1,562					
1937.....											
1936.....											
1935.....											
1934.....					114,000	2,045					
1933.....					46,000	853				2,109	4,670
1932.....											
1931.....											
1930.....											
1929.....	1	30								1,145	4,580
1928.....										550	7,150
1927.....								7	248	38	494
1926.....											
1925.....								20	1,000		
1924.....											
1923.....								15	750		
1922.....								50	2,500		
1921.....								30	1,500		
1920.....	587	6,889									
1919.....	616	10,559					1,800				
1918.....	440	6,230					1,455				
1917.....							1,382				
1916.....							1,250				
1915.....							1,400				
1914.....							2,330				
1913.....							4,800				
1912.....							4,200				
1911.....							3,500				
1910.....							4,000				
1909 to 1898.....											
1897.....			flasks(a)								
1896.....			9	324							
1895.....			58	1,940							
			71	2,343							
Total.....	1,644	23,708		5,367	256,250	4,460	26,117	122	5,995	3,842	16,894

(a) 1895-1897—recorded as flasks.

* 1899—Production valued at \$525 included in Dominion total as Ontario and Quebec.

NOTE.—1937—Nickel production valued at \$37,753; and in 1936 a relatively small tonnage of nickel ore exported; no data available.

1918—Molybdenite production of 1,600 pounds, valued at \$1,840; 1917—3,705 pounds, valued at \$3,705 and in 1916 production valued at \$13,003, including antimony.

Table 10.—Historical Summary of the Mineral Production of British Columbia
—Continued

—	Platinum		Other Platinum Metals (Palladium, Rhodium, etc.)		Quartz		Sand and gravel		Silver		Sodium Carbonate	
	fine oz.	\$	fine oz.	\$	tons	\$	tons	\$	fine oz.	\$	tons	\$
1938	16	515					2,211,682	751,491	11,186,563	4,863,582	252	2,268
1937	22	1,066					1,648,963	733,935	11,530,177	5,174,859	286	2,574
1936	20	809			146	788	1,753,415	596,796	9,748,715	4,399,303	192	1,677
1935	39	1,275			11,056	4,771	1,381,720	481,620	9,178,400	5,946,677	242	2,430
1934	53	2,051			24,847	13,990	958,149	335,142	8,729,721	4,143,204	244	1,920
1933	40	1,400			22,668	17,681	961,672	332,962	6,737,057	2,548,817	559	5,773
1932	59	2,372			15,621	8,435	1,487,513	525,604	7,293,462	2,309,958	495	5,450
1931	50	1,783			519	1,297	2,726,704	914,322	8,061,599	2,408,000	712	7,351
1930	24	1,089	52	1,356	1,095	5,291	2,494,743	819,739	11,825,930	4,512,065	364	4,550
1929	45	2,828	177	6,836	9,642	45,947	2,425,996	665,132	10,156,408	5,382,185	600	8,100
1928	80	4,549	520	22,270	16,017	43,876	2,334,270	529,669	10,943,367	6,366,413	519	4,922
1927	11	960			20,859	80,824	1,379,143	342,021	11,040,445	6,223,499	805	9,995
1926	50	4,258			6,466	77,060	1,486,254	357,985	10,625,816	6,599,376	595	5,370
1925	6	715			853	2,262	1,415,232	446,896	8,579,458	5,925,403	1,120	8,140
1924	5	569			21,358	43,034	1,105,459	344,937	8,153,003	5,444,657	510	5,173
1923	7	816			25,590	47,029	434,194	266,119	6,113,327	3,965,899	265	3,975
1922	12	1,154			17,425	37,521	960,251	304,071	7,150,937	4,828,384	202	3,027
1921	23	1,726			22,288	62,317			3,350,357	2,099,133	197	14,775
1920	17	719			35,876	141,200			3,327,028	3,356,971		
1919	25	2,150			32,715	340,313			3,713,537	4,126,556		
1918	39	2,560			49,886	149,658			3,921,336	3,794,755		
1917	57	3,823			37,755	132,143			2,655,994	2,162,430		
1916	15	600			41,077	82,154	578,424	230,197	3,392,872	2,227,794		
1915	23	1,063			30,559	61,118	868,240	256,454	3,565,852	1,771,658		
1914								391,731	3,159,897	1,731,971		
1913	18	489						180,863	3,312,343	1,980,483		
1912								385,946	2,651,002	1,612,737		
1911									1,887,147	1,005,924		
1910									2,407,887	1,287,823		
1909									2,649,141	1,364,387		
1908									2,631,389	1,391,058		
1907									2,745,448	1,793,519		
1906									2,990,262	1,997,226		
1905	500								3,439,417	2,075,757		
1904	420								3,222,481	1,843,935		
1903									2,996,204	1,601,471		
1902	190								3,917,917	2,043,586		
1901	457								5,151,333	3,036,711		
1900									3,958,175	2,427,548		
1899	825								2,939,413	1,751,302		
1898	1,500								4,292,401	2,500,753		
1897	1,600								5,472,971	3,272,289		
1896	750								3,135,343	2,102,561		
1895	3,800								1,496,522	976,930		
1894	950								746,379	470,219		
1893	1,800									195,000		
1892	3,500								77,160	67,592		
1891	10,000								3,306	3,266		
1890	4,500								70,427	73,666		
1889	3,500								53,192	49,787		
1888	6,000								79,780	74,993		
1887	5,600								17,690	17,301		
Total	87,231		749	30,462	444,318	1,398,709		10,193,632	246,485,988	139,331,433	8,159	97,470

NOTE.—In addition there was produced in 1931 - 731 pounds of selenium valued at \$1,389.

Table 10.—Historical Summary of the Mineral Production of British Columbia
—Continued
STONE

—	Granite		Limestone		Marble		Sandstone		Grindstones, pulpstones		Slate	
	tons	\$	tons	\$	\$	\$	tons	\$	tons	\$	tons	\$
1938.....	148,896	160,457	125,842	124,322			13,325	41,825			274	3,295
1937.....	273,692	318,725	176,513	177,939			13,220	52,561	87	4,875	186	2,790
1936.....	243,427	131,750	122,535	123,607	175	2,110	18,434	135,944	87	4,500	184	2,479
1935.....	118,782	100,432	215,933	189,381	604	5,471	21,576	63,006	202	10,829	310	3,100
1934.....	48,809	73,081	161,755	142,560	150	1,416			402	17,625	312	3,744
1933.....	94,967	109,512	150,805	130,706	300	2,547	4,200	10,760	200	9,000	250	3,750
1932.....	266,008	261,144	138,132	109,399	482	4,029	3,020	3,480	60	3,500	250	3,750
1931.....	302,150	322,014	159,198	162,269	810	8,761	9,559	592,740	322	25,795	250	5,000
1930.....	229,000	283,739	122,409	145,443	6,363	31,141	3,319	258,172	329	26,222	150	3,000
1929.....	286,883	340,011	119,222	143,319	196	5,282	2,630	23,043	210	2,730		
1928.....	201,030	275,947	68,179	83,193	950	31,400	1,280	1,280	246	20,509		
1927.....	174,945	241,412	81,008	107,984	600	18,600			380	27,600		
1926.....	163,077	244,197	81,844	106,220			8,140	7,830	700	45,116		
1925.....	192,177	264,910	58,172	54,059			5,877	18,227	481	27,781		
1924.....	150,522	248,360	27,053	21,881			650	83,500	240	19,000		
1923.....	151,389	230,582	13,711	19,284								
1922.....	159,904	268,008	36,566	44,583			1,200	12,000				
1921.....	108,225	186,629	33,816	42,536								
1920.....	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)				
1919.....	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)				
1918.....	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)				
1917.....		66,170		89,808				110,000				
1916.....		464,949		92,769				6,500				
1915.....		701,593		79,583			1,700	14,000				
1914.....		918,131		51,435			3,343	51,774				
1913.....		469,666		38,830			600	71,783				
1912.....		624,178		55,617				99,816				
1911.....		460,851		56,780			1,600	179,580				
1910.....		244,767		43,121			3,679	130,825				
1909.....		134,310		37,258			25,000	168,513				
Total.....									3,946	245,082	2,166	30,908

(a) Data by kinds not available; total values of all kinds of stone were:—1918—\$187,842; 1919—\$217,006; 1920—\$276,505.

Table 10.—Historical Summary of the Mineral Production of British Columbia
—Concluded

—	Sulphur*		Talc		Zinc†		Other products
	tons	\$	tons	\$	lb.	\$	\$
1938.....	78,918	777,586	.....	.....	299,363,564	9,199,443	.....
1937.....	88,370	820,406	.....	.....	287,192,877	14,078,195	.....
1936.....	64,896	608,792	47	799	255,668,574	8,475,413	.....
1935.....	46,784	453,536	93	1,318	255,222,315	7,909,314	.....
1934.....	32,031	319,124	25	502	249,152,403	7,583,202	.....
1933.....	30,010	282,078	67	1,022	152,826,264	4,906,487	.....
1932.....	31,886	302,856	39	702	130,546,958	3,140,438	.....
1931.....	29,013	255,760	30	600	202,071,702	5,160,911	.....
1930.....	17,800	147,942	177	2,835	250,479,310	9,017,255	.....
1929.....	28,276	226,208	46	720	172,096,841	9,270,857	.....
1928.....	32,063	254,872	.....	.....	163,530,890	8,983,079	.....
1927.....	37,379	149,516	107	2,620	148,306,479	9,186,103	.....
1926.....	3,374	16,870	.....	.....	137,033,929	10,154,214	.....
1925.....	2,670	13,350	92	1,589	99,152,966	7,557,439	.....
1924.....	8,091	40,459	165	3,630	96,000,069	6,090,244	.....
1923.....	3,457	13,304	245	5,390	60,050,000	3,967,504	.....
1922.....	6,908	34,540	191	4,780	56,290,000	3,217,536	.....
1921.....	3,597	4,557	167	4,175	53,089,356	2,471,310	925,361
1920.....	11,275	56,376	110	3,100	38,729,762	2,970,960	1,270,298
1919.....	6,730	33,650	100	500	30,295,015	2,223,048	373,193
1918.....	18,238	63,454	.....	.....	32,280,247	2,633,745	103,739
1917.....	5,709	28,545	25	400	27,861,441	2,479,947	241,661
1916.....	1,060	5,300	53	848	21,701,560	2,778,667	.....
1915.....	.....	.....	.....	.....	tons	.....	.....
1914.....	.....	.....	.....	.....	14,595	538,438	15,833
1913.....	.....	.....	.....	.....	9,924	252,546	671
1912.....	.....	.....	.....	.....	7,554	180,127	.....
1911.....	.....	.....	.....	.....	6,405	211,399	.....
1910.....	.....	.....	.....	.....	2,590	101,072	.....
1909.....	.....	.....	.....	.....	4,487	114,243	(b) 494,197
1908.....	.....	.....	.....	.....	(a) 17,476	233,719	(c) 330,201
1907.....	.....	.....	.....	.....	.....	.....	(d) 643,534
1906.....	.....	.....	.....	.....	1,356	46,100	.....
1905.....	.....	.....	.....	.....	654	17,100	.....
1905.....	.....	.....	.....	.....	9,413	139,200	.....
Total.....	588,535	4,909,081	1,779	35,530	.....	145,289,285	4,398,688

NOTE.—1934—Production of 30 tons of volcanic dust, valued at \$600.

*Sulphur content of pyrites shipped and sulphur content salvaged smelter gas 1928-1938; figures for previous years represent tonnages and value of pyrites shipped.

†1905-1915 tons of ore or concentrates shipped from mines; 1916-1938 refined zinc made in Canada plus concentrated zinc in ores exported.

(a) Includes 7,424 tons shipped late in 1908.

(b) Includes cement sand-lime brick, etc.

(c) Includes cement, sand-lime brick, and a small value in refined antimony.

(d) Includes stone, etc.

Table 10.—Historical Summary of the Mineral Production of Yukon

—	Coal (d)		Copper		Gold (c)		Lead		Silver	
	tons	\$	pounds	\$	fine oz.	\$	pounds	\$	fine oz.	\$
1938.....	361	3,400			72,368	2,545,544	5,198,990	173,854	2,844,659	1,236,772
1937.....	84	812			47,982	1,678,890	6,440,454	329,107	3,956,504	1,775,719
1936.....	510	2,286			50,358	1,764,041	2,568,699	100,513	783,416	353,532
1935.....	835	3,483			35,707	1,256,529	218,513	6,846	54,715	35,450
1934.....	638	2,217			38,798	1,338,531	1,783,349	43,450	515,542	244,681
1933.....	862	3,670			39,493	1,129,500	3,099,505	74,128	2,204,237	833,925
1932.....	808	3,491			40,608	953,438	3,853,327	81,444	3,014,755	954,822
1931.....	904	5,039			44,310	955,539	4,454,613	120,724	3,694,728	1,103,615
1930.....	653	3,110	42,628	5,534	35,517	734,202	8,896,582	349,369	3,746,326	1,429,373
1929.....	458	1,848			35,892	741,954	8,395,603	424,012	3,279,530	1,737,922
1928.....	414	2,815	(a) 107,377	15,645	34,364	710,367	7,191,449	329,045	2,839,633	1,651,985
1927.....	414	2,052			30,935	639,483	4,165,331	218,929	1,647,295	928,580
1926.....	316	900			25,601	529,220	5,860,373	395,634	2,095,027	1,301,159
1925.....	730	7,147			47,817	988,465	1,875,442	171,040	904,893	624,964
1924.....	1,121	8,265			34,825	719,897	903,520	73,221	226,755	151,429
1923.....	313	1,485			60,144	1,243,287	6,771,113	486,098	1,914,438	1,241,953
1922.....	465	4,050			54,456	1,125,705	3,323,508	207,221	663,493	447,997
1921.....	233	2,472			65,994	1,364,217	2,472,615	141,978	393,092	246,288
1920.....			277,712	48,478	72,778	1,504,455			19,190	19,363
1919.....			165,184	30,874	90,705	1,875,039			27,556	30,621
1918.....	2,900	11,600	619,878	152,663	102,474	2,118,325	9,249	856	71,915	69,594
1917.....	4,872	(f) 29,232	2,460,079	668,650	177,667	3,672,703	127,844	14,238	119,605	97,379
1916.....	3,300	13,200	2,807,096	763,586	212,700	4,396,900	955,222	81,318	360,101	236,446
1915.....	9,724	38,896	533,216	92,113	230,173	4,758,098	810,000	45,360	248,049	123,241
1914.....	13,443	53,760	1,367,050	185,946	247,940	5,125,374	47,920	2,146	92,973	50,959
1913.....	19,722	95,945	1,843,530	281,489	282,838	5,846,780		131	87,626	52,392
1912.....	9,245	44,958	1,772,660	289,670	268,447	5,549,296			81,068	49,318
1911.....	2,840	12,780			224,197	4,634,574			112,708	60,078
1910.....	16,185	110,925	286,000	36,431	221,091	4,570,362			87,418	46,756
1909.....	7,364	49,502			191,565	3,960,000			45,000	23,176
1908.....	3,847	21,155	112,264	14,828	174,150	3,600,000			63,000	33,304
1907.....	15,000	60,000	511,838	102,388	152,381	3,150,000			35,988	23,510
1906.....	7,000	28,000	(b) 156,000	23,400	270,900	5,600,000			63,665	42,522
1905.....	7,000	21,000			381,001	7,876,000			89,630	54,093
1904.....					507,938	10,500,000			133,170	76,201
1903.....	1,849	29,584			592,594	12,250,000			156,000	83,362
1902.....	4,910	37,280			701,437	14,500,000			185,900	96,985
1901.....	(e) 5,864	86,230			870,750	18,000,000			195,000	114,953
1900.....					1,077,553	22,275,000			290,000	177,857
1899.....					774,000	16,000,000			230,000	137,034
1898.....					483,750	10,000,000				
1897.....					120,937	2,500,000				
1896.....					14,513	300,000				
1895.....					12,094	250,000				
1894.....					6,047	125,000				
1893.....					8,514	176,000				
1892.....					4,233	87,500				
1891.....					1,953	40,000				
1890.....					8,466	175,000				
1889.....					8,466	175,000				
1888.....					1,935	40,000				
1887.....					3,380	70,000				
1886.....					4,837	100,000				
1885.....										
Totals.....	145,184	803,192	13,062,512	2,711,695	9,299,579	196,220,215	79,426,025	3,870,662	37,574,600	17,999,310

(a) Includes small quantities produced in 1925, 1926 and 1927.

(b) 1906 and all previous production.

(c) Placer gold but includes a small production from lode mines in 1926 and for the years 1910-1923.

(d) for the years 1919-1938 the tonnage shown is the total output from all mines; for previous years the figures shown include only colliery consumption, sales and coal used by operators.

(e) Partly mined in 1900.

(f) Value estimated.

Note.—In addition there were produced in 1918 some 3,848 pounds of tungsten concentrates valued at \$2,593 and in 1916 20 tons of antimony ore valued at \$160.

Table 10.—Historical Summary of the Mineral Production of Northwest Territories

—	Copper		Gold		Lead		Natural Gas		Petroleum		Silver (a)	
\$	pounds	\$	fine oz.	\$	pounds	\$	M cu. ft.	\$	barrels	\$	fine oz.	\$
1938†.....	75,567	7,535	6,800	239,190	.....	.....	1,500	335	22,855	68,565	581,902	252,993
1937†.....					.....	.....	1,500	335	11,371	56,855	135,442	60,788
1936†.....			1	35	.....	.....	1,100	245	5,399	26,995	317,014	143,059
1935†.....			200	7,038	12,905	404	.....	.....	5,115	25,575	146,506	94,921
1934†.....					3,531	86	.....	.....	4,438	22,188	37,778	17,930
1933.....								.....	4,608	23,037	23,239	8,792
1932.....								.....	910	9,251	38,433	12,172
1931.....								.....			(*)	(*)
Total.....	75,567	7,535	7,001	246,263	16,436	490	4,100	915	54,696	232,466	.....	.....

(a) Includes recoveries from silver-pitchblende ores.

(*) See Yukon.

† During 1934 the Port Hope (Ontario) refinery of Eldorado Gold Mines Ltd., received from the Eldorado mine at Great Bear Lake, N.W.T., 77 tons of pitchblende and silver ore and seven tons of concentrates. Twenty-six tons of ores were treated during the year with recovery of radium, uranium, silver and lead amounting to \$210,000. During 1935 the mill at the mine treated 14,402 tons of ore; pitchblende and silver concentrates totalled 296 tons valued at \$752,918; during 1935 recovery at the Port Hope refinery of radium, uranium, silver and lead amounted to about \$490,000. In 1936 flotation and other concentrates together with cobbled ore produced totalled 401.5 tons with a gross value of \$1,349,388; shipments from the mine consisted of 326.5 tons of pitchblende concentrate to the Port Hope (Ontario) refinery and 40.5 tons of copper-silver concentrate to Tacoma, Washington, U.S.A. In 1937 shipments from the mine consisted of 396.3 tons of pitchblende-silver concentrates and 169.8 tons of silver-copper concentrates; the total value of finished products of radium, uranium, and silver amounted to \$850,000 according to the 1937 annual printed report of the Eldorado Gold Mines Ltd. During 1938 there were 689 tons of pitchblende-silver concentrates valued at \$1,560,824 shipped from the mine to the Port Hope refinery and 104 tons of copper-silver concentrates valued at \$32,649 shipped to Tacoma, Wash. The silver content of all Eldorado shipments is included under silver in Table 10.

Table 11.—Principal Statistics of the Mineral Industry in Canada, by Industries, 1935-1938

1	2	3	4	5	6	7	8
Year	Number of active firms	Number of operating mines, oil and gas wells, quarries, gravel pits, etc.	Capital employed (excluding ore reserves or other unmined material)	Number of employees	Salaries and wages	Cost of process supplies, purchased electricity and fuel also freight and smelter charges (d)	Net value of bullion, ore, concentrates, residues and other minerals shipped from the mines, smelters, brick and cement plants and quarries (c)
			\$		\$	\$	\$
Metal Mining Industries							
ALLUVIAL GOLD MINES							
1935.....	84	86	9,198,533	702	1,227,971	91,737	2,106,025
1936.....	80	85	10,965,524	853	1,519,659	166,574	2,893,981
1937.....	106	109	11,919,937	1,069	1,689,911	176,560	3,066,636
1938.....	111	113	12,846,973	1,071	2,056,936	288,370	3,753,052
AURIFEROUS QUARTZ MINES							
1935.....	377	384	193,728,802	19,834	31,523,907	16,594,031	75,120,774
1936.....	580	607	256,018,578	25,097	39,826,742	19,882,784	88,210,233
1937.....	631	659	269,145,649	29,140	48,219,318	24,714,827	97,961,278
1938.....	535	550	251,203,802	29,647	50,462,092	28,674,805	114,472,106
COPPER-GOLD-SILVER MINES							
1935.....	16	18	38,461,682	3,430	5,040,196	3,433,284	13,243,163
1936.....	26	27	40,732,717	3,738	5,473,325	3,652,068	15,619,597
1937.....	35	38	73,338,258	5,164	8,240,614	15,832,950	24,902,851
1938.....	37	39	65,416,729	5,577	8,921,465	20,544,691	28,795,492
SILVER-COBALT MINES							
1935.....	27	28	6,380,731	402	494,791	246,218	2,070,716
1936.....	24	25	5,946,702	363	458,546	181,592	915,376
1937.....	23	25	2,655,060	300	394,386	312,624	540,762
1938.....	34	30	2,696,217	297	386,851	446,070	288,293
SILVER-LEAD-ZINC MINES*							
1935.....	69	70	16,596,941	1,657	2,431,110	1,205,822	10,553,086
1936.....	88	89	19,372,600	1,870	2,917,832	1,894,495	13,814,645
1937.....	128	130	29,637,739	2,220	3,914,643	5,788,385	22,740,582
1938.....	107	108	30,386,714	1,640	3,027,915	5,068,253	18,483,945
NICKEL-COPPER MINES							
1935.....	4	7	26,685,284	3,552	6,059,407	3,461,632	11,030,621
1936.....	5	9	30,131,192	4,406	7,331,542	4,102,807	18,710,379
1937.....	8	11	33,979,540	5,462	10,193,491	5,185,229	25,812,659
1938.....	8	11	35,363,940	5,342	9,916,179	5,174,237	25,491,028
MISCELLANEOUS METAL MINES							
1935.....	12	12	733,497	82	63,612	9,300	22,847
1936.....	11	11	770,957	113	142,974	30,345	3,147
1937.....	15	15	1,320,012	121	155,191	33,385	52,655
1938.....	19	19	1,380,035	129	145,551	16,906	— 7,997
Non-Ferrous Metal Smelting and Refining							
1935.....	12	14	145,686,299	8,944	12,687,356	(b)126,804,075	† 59,441,583
1936.....	11	14	143,858,717	10,015	14,346,050	(b)158,460,775	† 71,276,645
1937.....	10	13	162,696,595	11,570	17,990,947	(b)216,470,386	† 101,807,865
1938.....	10	13	184,337,126	12,788	19,549,963	(b)200,204,359	† 87,091,374
Total Metal Mining Industries							
1935.....	601	619	437,471,769	38,603	59,528,350	151,846,099	173,588,815
1936.....	825	867	507,796,987	46,455	72,016,670	188,371,440	211,444,303
1937.....	956	1,000	584,692,790	55,046	90,798,501	268,514,346	276,895,288
1938.....	861	883	583,631,536	56,491	94,466,952	260,417,691	278,367,293

*Contains data relating to silver-pitchblende ores in the Northwest Territories. †Value added by smelting.

(b) Includes fuel and electricity used for metallurgical purposes and cost of ores treated which were \$108,081,399 in 1935 \$137,857,432 in 1936 and \$191,303,251 in 1937 and \$173,070,377 in 1938.

(c) See footnote at end of this table.

(d) See end of table.

Table 11.—Principal Statistics of the Mineral Industry in Canada, by Industries,
1935-1938—Continued

1	2	3	4	5	6	7	8
Year	Number of active firms	Number of operating mines, oil and gas wells, quarries, gravel pits, etc.	Capital employed (excluding ore reserves or other unmined material)	Number of employees	Salaries and wages	Cost of process supplies, purchased electricity and fuel, also freight and smelter charges (d)	Net value of bullion, ore, concentrates, residues and other minerals shipped from the mines, smelters, brick and cement plants and quarries (c)
			\$		\$	\$	\$
Non-Metal Mining Industries, Including Fuels							
*FUELS							
COAL							
1935.....	516	556	110,516,517	26,198	26,595,344	12,851,633	26,894,671
1936.....	516	553	109,703,043	26,918	28,873,135	8,088,154	34,852,621
1937.....	480	503	118,273,848	27,202	31,641,679	8,717,711	37,261,013
1938.....	462	498	111,495,137	27,074	28,699,781	7,926,328	34,207,513
NATURAL GAS							
1935.....	199	3,190	69,221,051	1,719	1,932,937	215,918	6,580,061
1936.....	227	3,253	77,666,568	2,075	2,456,918	79,034	9,062,657
1937.....	218	3,268	75,611,107	2,028	2,438,125	98,880	8,938,446
1938.....	218	3,325	79,143,830	1,966	2,506,121	82,887	9,748,677
PETROLEUM							
1935.....	244	2,285	33,398,894	940	1,046,046	808,500	3,217,927
1936.....	256	2,266	33,289,876	1,052	1,298,592	510,016	3,439,317
1937.....	280	2,328	42,147,521	1,620	2,340,359	1,109,966	4,892,672
1938.....	310	2,400	51,685,038	1,894	2,656,112	1,141,762	8,986,071
TOTAL FUELS							
1935.....	959	6,031	213,136,462	28,857	29,574,327	13,876,051	36,692,659
1936.....	999	6,072	220,659,487	30,045	32,628,645	8,677,204	47,354,595
1937.....	978	6,099	236,032,476	30,850	36,470,163	9,926,557	51,092,131
1938.....	990	6,223	242,324,005	30,934	33,862,014	9,150,977	52,942,261
OTHER NON-METAL MINING INDUSTRIES							
ABRASIVES—NATURAL							
1935.....	9	9	114,114	42	25,135	6,326	60,824
1936.....	8	8	77,279	30	17,442	3,528	34,846
1937.....	(a)	(a)	(a)	(a)	(a)	(a)	(a)
1938.....	(a)	(a)	(a)	(a)	(a)	(a)	(a)
ASBESTOS							
1935.....	8	9	16,805,583	2,072	1,904,053	2,058,451	4,996,163
1936.....	10	11	18,877,326	2,647	2,642,924	2,399,475	7,553,708
1937.....	10	11	21,249,676	3,842	4,232,507	4,076,235	10,429,556
1938.....	8	9	22,008,771	3,711	4,024,363	3,187,725	9,702,470

*Production of peat since 1929 included in the miscellaneous non-metallics.

(c) See footnote at end of this table.

(a) Included with miscellaneous.

(d) See footnote at end of table.

Table 11.—Principal Statistics of the Mineral Industry in Canada, by Industries, 1935-1938—Continued

1	2	3	4	5	6	7	8
Year	Number of active firms	Number of operating mines, oil and gas wells, quarries, gravel pits, etc.	Capital employed (excluding ore reserves or other unmined material) \$	Number of employees	Salaries and wages \$	Cost of process supplies, purchased electricity and fuel also freight and smelter charges (d) \$	Net value of bullion, ore, concentrates, residues and other minerals shipped from the mines, smelters, brick and cement plants and quarries (c) \$

OTHER NON-METAL MINING INDUSTRIES—Continued

FELDSPAR, QUARTZ, AND NEPHELINE SYENITE

1935.....	28	28	1,151,986	260	182,792	58,012	511,200
1936.....	34	34	1,400,024	324	238,848	160,913	628,769
1937.....	39	39	1,352,992	445	384,698	186,470	1,242,244
1938.....	32	32	1,605,136	375	342,248	168,509	1,065,138

GYPSUM

1935.....	6	13	5,737,114	467	367,007	187,027	745,176
1936.....	9	14	8,954,654	514	440,297	218,869	1,060,102
1937.....	8	13	6,902,222	602	595,396	263,077	1,277,406
1938.....	9	15	7,325,412	623	528,027	239,306	1,262,959

IRON OXIDES (OCHRE)

1935.....	5	5	175,935	32	26,748	12,264	64,836
1936.....	6	6	167,499	39	30,281	11,419	58,211
1937.....	6	6	213,248	50	35,368	13,878	69,762
1938.....	6	6	200,057	37	31,557	8,124	63,645

MICA

1935.....	24	24	145,557	92	45,217	695	81,343
1936.....	22	22	221,800	101	44,550	4,824	69,732
1937.....	34	34	150,569	199	97,547	17,546	116,185
1938.....	40	40	159,758	156	74,424	19,247	61,742

SALT

1935.....	10	10	3,776,333	473	597,785	213,940	1,667,038
1936.....	9	9	3,856,187	506	640,644	212,697	1,560,447
1937.....	9	9	4,001,568	543	653,136	259,064	1,540,401
1938.....	9	9	4,270,799	562	786,720	309,080	1,603,833

TALC AND SOAPSTONE

1935.....	8	8	639,501	94	69,803	37,411	134,121
1936.....	7	7	647,929	85	70,935	33,392	143,878
1937.....	7	7	625,497	83	72,020	25,394	138,420
1938.....	6	6	212,491	75	59,426	23,907	120,941

MISCELLANEOUS

1935.....	44	44	2,555,124	366	357,837	254,948	785,784
1936.....	41	41	2,195,621	477	526,248	548,434	1,006,194
1937.....	53	53	3,050,376	530	658,723	550,872	1,136,445
1938.....	50	50	2,787,671	394	475,567	409,229	779,093

(c) See footnote at end of this table.

(d) See footnote at end of this table.

† Includes natural abrasives data for first time.

Table 11.—Principal Statistics of the Mineral Industry in Canada, by Industries, 1935-1938—Continued

1	2	3	4	5	6	7	8
Year	Number of active firms	Number of operating mines, oil and gas wells, quarries, gravel pits, etc.	Capital employed (excluding ore reserves or other unmined material) \$	Number of employees	Salaries and wages \$	Cost of process supplies, purchased electricity and fuel also freight and smelter charges (d) \$	Net value of bullion, ore, concentrates, residues and other minerals shipped from the mines, smelters, brick and cement plants and quarries (c) \$

TOTAL OTHER NON-METAL MINING INDUSTRIES—Concluded

1935.....	142	150	31,101,247	3,898	3,576,377	2,829,074	9,046,485
1936.....	146	152	36,398,319	4,723	4,652,169	3,593,551	12,180,887
1937.....	168	172	37,546,148	6,894	6,729,395	5,392,536	15,950,419
1938.....	160	167	33,570,095	5,933	6,322,332	4,365,127	14,659,821

Total Non-Metal Mining Industries, Including Fuels

1935.....	1,101	6,181	244,237,709	32,755	33,150,704	16,705,125	45,739,144
1936.....	1,145	6,224	257,057,806	34,768	37,280,814	12,270,755	59,475,482
1937.....	1,144	6,271	273,578,624	37,144	43,199,558	15,319,093	67,042,550
1938.....	1,150	6,390	280,894,100	36,867	40,184,346	13,516,104	67,602,082

Clay Products and Other Structural Materials

CLAY PRODUCTS

Brick, Tile and Sewer Pipe

1935.....	129	136	20,144,431	1,609	1,293,159	666,163	2,127,241
1936.....	129	136	19,487,227	1,651	1,397,395	747,183	2,506,008
1937.....	131	137	20,087,448	2,159	2,002,075	1,121,784	3,163,758
1938.....	140	147	17,756,732	2,125	2,009,836	1,039,148	3,284,486

STONEWARE AND POTTERY

1935.....	3	3	357,575	119	94,765	13,415	205,744
1936.....	4	4	376,204	124	100,753	19,171	198,665
1937.....	6	6	339,784	128	92,717	14,569	216,778
1938.....	5	5	311,810	117	100,397	14,701	197,749

TOTAL CLAY PRODUCTS *

1935.....	132	139	20,502,006	1,728	1,387,924	679,578	2,338,985
1936.....	133	140	19,863,431	1,776	1,498,148	766,354	2,704,673
1937.....	137	143	20,427,232	2,287	2,094,792	1,136,323	3,380,536
1938.....	145	152	18,068,542	2,243	2,110,233	1,053,849	3,482,835

OTHER STRUCTURAL MATERIALS †

CEMENT

1935.....	4	9	52,454,004	924	1,027,416	1,621,674	3,958,369
1936.....	4	9	53,343,991	1,052	1,196,664	2,169,071	4,739,121
1937.....	4	9	54,150,672	1,083	1,373,444	2,445,333	6,650,534
1938.....	3	8	52,299,046	1,034	1,306,331	2,293,584	5,947,766

(c) See footnote at end of this table.

(d) See footnote at end of this table.

* Includes kaolin and other clays.

† A considerable proportion of the values shown for lime and stone sales represents shipments for chemical purposes—see Chapter 9.

Table 11.—Principal Statistics of the Mineral Industry in Canada, by Industries,
1935-1938—Concluded

1	2	3	4	5	6	7	8
Year	Number of active firms	Number of operating mines, oil and gas wells, quarries, gravel pits, etc.	Capital employed (excluding ore reserves or other unmined material)	Number of employees	Salaries and wages	Cost of process supplies, purchased electricity and fuel also freight and smelter charges (d)	Net value of bullion, ore, concentrates, residues and other minerals shipped from the mines, smelters, brick and cement plants and quarries (c)
			\$		\$	\$	\$
<i>OTHER STRUCTURAL MATERIALS—Concluded</i>							
<i>LIME</i>							
1935.....	49	54	5,707,391	756	556,049	810,437	2,115,354
1936.....	52	57	6,106,901	799	640,322	839,979	2,495,991
1937.....	52	57	4,931,831	872	781,274	1,038,953	2,785,959
1938.....	48	53	4,881,214	867	795,068	939,989	2,602,663
<i>SAND AND GRAVEL</i>							
1935.....	1,398	5,400	4,849,702	3,015	2,479,418	116,063	6,273,377
1936.....	1,356	5,374	2,994,127	3,638	2,090,388	101,059	6,820,340
1937.....	1,560	7,373	6,706,288	6,084	3,468,471	295,348	10,197,348
1938.....	1,339	6,094	3,286,340	6,959	4,482,916	254,595	11,747,959
<i>STONE</i>							
1935.....	372	496	12,277,518	2,475	1,950,698	734,339	4,573,224
1936.....	426	558	11,899,852	2,512	2,043,216	841,704	4,292,449
1937.....	418	555	12,857,537	2,898	2,576,344	1,085,548	5,853,812
1938.....	429	550	11,187,274	2,815	2,298,154	890,350	4,665,676
<i>TOTAL OTHER STRUCTURAL MATERIALS</i>							
1935.....	1,883	5,959	75,988,615	7,170	6,013,581	3,282,513	16,990,384
1936.....	1,838	6,998	74,344,871	8,001	6,970,590	3,951,813	18,347,901
1937.....	2,034	7,994	78,646,328	10,937	8,199,533	4,865,187	25,487,653
1938.....	1,819	6,705	71,653,874	11,675	8,882,469	4,378,518	24,964,064
<i>Total Clay Products and Other Structural Materials</i>							
1935.....	1,955	6,095	95,790,621	8,898	7,401,505	3,962,091	19,253,309
1936.....	1,971	6,138	94,298,302	9,776	7,468,738	4,718,167	21,052,574
1937.....	2,171	8,137	99,073,560	13,224	10,294,325	6,001,510	28,868,189
1938.....	1,964	6,857	89,722,416	13,917	10,992,702	5,432,367	28,446,299
<i>GRAND TOTAL OF ALL INDUSTRIES</i>							
1935.....	3,657	12,898	777,500,099	80,256	100,080,559	172,513,315	238,581,268
1936.....	3,941	13,229	859,063,095	90,999	116,766,222	205,360,362	291,972,359
1937.....	4,271	15,408	957,344,974	105,414	144,292,384	289,834,949	372,796,027
1938.....	3,975	14,130	954,248,052	107,275	145,644,000	279,366,162	374,415,674

(c) The value of fuel, purchased electricity and process supplies used was deducted from the gross value of shipments for the first time in 1935; this was done in order to attain a more accurate approximation of a net value. Also the cost of ores, etc., treated in non-ferrous metallurgical plants is deducted in determining the figure "value added"; these costs were as follows: 1935, \$108,081,299; 1936, \$137,857,432; 1937, \$191,303,251; 1938, \$173,070,377. (d) The cost of freight and treatment charges was deducted by the shipper of metal bearing ores for all years prior to 1937; in 1937 and 1938 the cost of freight and treatment charges was reported separately and deducted at the Bureau of Statistics, Ottawa.

NOTE.—The net value as given in column 8 represents the **gross value** as given by the operator less the cost of items indicated in column 7.

Table 12.—Principal Statistics of the Mineral Industry in Canada, by Provinces, 1935-1938

1	2	3	4	5	6	7
Year	Number of operating mines, oil and gas wells, quarries, gravel pits, etc.	Capital employed (excluding ore reserves or other unmined material)	Number of employees	Salaries and wages	Cost of process supplies, purchased electricity and fuel, also freight and smelter charges (b) (d)	Net value of bullion, ore concentrates, residues and other minerals shipped from the mines, smelters, brick and cement plants and quarries (*)
		\$		\$	\$	\$
(c) NOVA SCOTIA						
1935.....	267	53,569,182	14,550	14,301,510	7,758,899	14,207,064
1936.....	365	55,513,999	15,368	15,980,687	5,645,436	19,136,304
1937.....	1,210	59,114,458	15,629	18,373,958	6,076,253	22,597,547
1938.....	810	52,594,162	15,591	15,959,095	5,258,556	20,224,347
NEW BRUNSWICK						
1935.....	520	4,522,963	2,390	1,865,407	331,315	2,467,339
1936.....	423	5,253,829	1,744	1,248,431	242,114	2,324,747
1937.....	423	4,676,203	3,012	1,509,063	293,867	2,442,101
1938.....	409	4,310,273	3,042	2,074,273	273,978	3,506,250
QUEBEC						
1935.....	3,850	117,534,858	11,811	12,794,600	39,781,783	33,679,150
1936.....	4,011	140,537,708	14,225	15,774,362	48,436,955	44,823,567
1937.....	5,120	181,868,872	19,121	22,708,131	67,723,503	60,872,828
1938.....	4,161	179,013,810	20,829	24,485,254	79,226,191	69,593,807
ONTARIO						
1935.....	6,274	322,300,162	25,264	38,152,140	81,172,486	130,220,051
1936.....	6,297	384,535,666	31,105	46,899,805	108,353,709	151,874,462
1937.....	6,343	389,129,937	36,238	58,891,339	145,830,800	190,447,576
1938.....	6,342	389,031,046	35,791	58,926,900	136,143,954	181,897,886
MANITOBA						
1935.....	119	40,944,700	2,346	3,403,649	9,720,167	9,040,591
1936.....	274	41,722,791	2,932	3,752,367	7,307,942	9,366,496
1937.....	275	55,815,784	3,159	4,301,366	14,293,086	13,415,841
1938.....	276	44,564,907	2,840	4,393,270	14,478,826	15,144,672
SASKATCHEWAN						
1935.....	223	11,390,801	1,457	1,343,041	2,336,670	2,869,351
1936.....	219	14,974,371	1,828	1,937,825	3,826,763	5,720,747
1937.....	248	22,037,133	2,307	2,372,443	7,376,254	8,226,326
1938.....	269	18,695,606	2,287	2,470,530	5,345,294	7,029,842
ALBERTA						
1935.....	555	102,656,116	9,706	10,862,198	4,876,482	16,738,472
1936.....	594	104,118,831	10,376	11,850,463	2,357,005	20,104,417
1937.....	637	110,055,642	10,843	12,924,934	2,819,959	20,988,638
1938.....	678	120,140,472	10,612	12,811,975	2,967,269	24,931,056

Plants in the provinces do not add to Canada total, owing to the fact that a plant located on the Manitoba-Saskatchewan boundary is counted but once.

* See footnote, preceding table.

(b) Includes fuel and electricity used for metallurgical purposes.

(c) Statistics for Prince Edward Island included with Nova Scotia in 1936.

(d) See footnote, previous table.

Table 12.—Principal Statistics of the Mineral Industry in Canada, by Provinces, 1935-1938—Concluded

1 Year	2 Number of operating mines, oil and gas wells, quarries, gravel pits, etc.	3 Capital employed (excluding ore reserves or other unmined material) \$	4 Number of employees	5 Salaries and wages \$	6 Cost of process supplies, purchased electricity and fuel, also freight and smelter charges (b) (d) \$	7 Net value of bullion, ore concentrates, residues and other minerals shipped from the mines, smelters, brick and cement plants and quarries (*) \$
BRITISH COLUMBIA						
1935.....	1,048	118,291,187	12,352	16,479,606	26,270,909	28,172,657
1936.....	1,029	103,483,250	12,827	17,908,553	28,553,612	36,694,755
1937.....	1,135	121,739,009	14,282	21,487,277	44,123,775	51,176,437
1938.....	1,158	129,667,163	15,179	21,975,143	33,686,771	49,519,855
NORTHWEST TERRITORIES						
1935.....	6	531,292	47	69,341	19,629	(a) 105,176
1936.....	4	274,883	28	40,812	12,140	(a) 14,415
1937.....	8	2,114,300	132	221,131	113,221	(a)—(e)
1938.....	17	4,186,077	310	584,619	407,710	(a)—(e)
YUKON						
1935.....	7	5,758,838	333	809,067	244,975	1,081,417
1936.....	14	8,647,767	566	1,372,917	624,686	1,912,449
1937.....	10	10,793,636	691	1,502,692	1,184,231	2,685,664
1938.....	11	12,044,536	794	1,962,941	1,577,613	2,667,051
Canada						
1935.....	12,898	777,500,099	80,256	100,080,559	172,513,315	238,581,268
1936.....	13,229	859,063,095	90,999	116,766,222	205,360,362	291,972,359
1937.....	15,408	957,344,974	105,414	144,292,384	289,834,949	372,796,027
1938.....	14,130	954,248,052	107,275	145,644,000	279,366,162	374,415,674

Plants in the provinces do not add to Canada total, owing to the fact that a plant located on the Manitoba-Saskatchewan boundary is counted but once.

*See footnote, preceding table.

(b) Includes fuel and electricity used for metallurgical purposes.

(d) See footnote, previous table.

(a) Value radium and uranium not included.

(e) N.W.T. showed a loss \$56,931 in 1937 and \$99,092 in 1938 owing to the fact that radium and uranium products are not included. These amounts should be subtracted from the total net value by provinces to give the total net value for Canada.

Table 13.—Employees, Salaries and Wages in the Mineral Industry in Canada, by Provinces, 1938

Province	*Average number of employees				Salaries and wages		
	Salaried employees		Wage earners	Total†	Salaries	Wages	Total
	Male	Female					
					\$	\$	\$
Nova Scotia.....	542	67	14,982	15,591	1,112,840	14,846,255	15,959,095
New Brunswick.....	71	15	2,956	3,042	158,184	1,916,089	2,074,273
Quebec.....	1,595	141	19,093	20,829	3,241,476	21,243,778	24,485,254
Ontario.....	2,611	401	32,779	35,791	6,835,238	52,091,662	58,926,900
Manitoba.....	300	16	2,524	2,840	735,941	3,657,329	4,393,270
Saskatchewan.....	198	18	2,071	2,287	433,783	2,036,747	2,470,530
Alberta.....	809	109	9,634	10,612	1,928,096	10,883,879	12,811,975
British Columbia.....	1,365	132	13,682	15,179	3,206,679	18,769,064	21,975,143
Yukon.....	64	10	720	794	190,582	1,772,359	1,962,941
N.W.T.....	40	1	269	310	76,724	507,895	584,619
Canada.....	7,655	910	98,710	107,275	17,918,943	127,725,057	145,644,000

* The average number of wage-earners was obtained by adding the monthly figures for individual companies and dividing by 12 irrespective of the number of months worked, the average number of wage-earners in the industry, as in the previous years, is the sum of these individual averages.

† The data are not inclusive of all individuals or syndicates engaged exclusively in prospecting or general exploration.

Table 14.—Employees, Salaries and Wages in the Mineral Industry in Canada, by Industries, 1938

Industry	*Average number of employees				Salaries and wages		
	Salaried employees		Wage-earners	Total	Salaries	Wages	Total
	Male	Female					
					\$	\$	\$
METAL MINING							
Alluvial Gold Mines.....	86	14	971	1,071	213,445	1,843,491	2,056,936
Auriferous Quartz Mines.....	2,536	173	26,938	29,647	6,159,608	44,302,484	50,462,092
Copper-Gold-Silver Mines.....	405	28	5,144	5,577	1,098,078	7,823,387	8,921,465
Silver-Cobalt Mines.....	32	3	262	297	59,304	327,547	386,851
Silver-Lead-Zinc Mines†.....	215	22	1,403	1,640	485,594	2,542,321	3,027,915
Nickel-Copper Mines.....	79	3	5,260	5,342	279,509	9,636,670	9,916,179
Miscellaneous Metal Mines.....	33	6	90	129	37,216	108,335	145,551
Non-ferrous Smelting and Refining.....	904	159	11,725	12,788	2,612,284	16,937,679	19,549,963
NON-METAL MINING, INCLUDING FUELS							
Coal.....	1,202	105	25,767	27,074	2,722,566	25,977,215	28,699,781
Natural Gas.....	640	168	1,158	1,966	1,152,029	1,354,092	2,506,121
Petroleum.....	235	47	1,612	1,894	497,517	2,158,395	2,656,112
Other Non-Metallic Mining							
Asbestos.....	272	41	3,398	3,711	584,792	3,439,371	4,024,363
Feldspar and Quarts (a).....	45	4	326	375	65,808	276,440	342,248
Gypsum.....	56	4	563	623	103,466	424,561	528,027
Iron Oxides.....	4	1	32	37	7,900	23,657	31,557
Mica.....	8	1	147	156	6,419	68,005	74,424
Salt.....	78	37	447	562	278,478	508,242	786,720
Talc and Soapstone.....	4	1	70	75	9,660	49,766	59,426
Miscellaneous.....	54	17	323	394	134,727	340,840	475,567
CLAY PRODUCTS AND OTHER STRUCTURAL MATERIALS							
Cement.....	95	5	934	1,034	218,445	1,087,886	1,306,331
Clay Products.....	252	26	1,964	2,242	525,502	1,584,731	2,110,233
Lime.....	68	9	790	867	112,998	682,070	795,068
Sand and Gravel.....	113	9	6,837	6,959	205,639	4,277,277	4,482,916
Stone.....	239	27	2,549	2,813	347,959	1,950,195	2,298,154
Total.....	7,655	910	98,710	107,275	17,918,943	127,725,057	145,644,000

* See footnote, preceding table.

† Includes pitchblende-silver mines.

(a) Includes nepheline-syenite mines.

Table 15.—The Number of Wage-earners in the Canadian Mining Industry, 1938, who Worked the Number of Hours Specified, during one week in Month of Normal Employment. (Does not include overtime)

	30 hours or less	31-43 hours	44 hours	45-47 hours	48 hours	49-50 hours	51-54 hours	55 hours	56-64 hours	65 hours and over	Grand total	Total wages paid in that week*
By Provinces—												\$
Nova Scotia.....	146	127	45	508	13,752	42	300	88	310	83	15,401	403,606
New Brunswick.....		13	26	6	4,272	24	203		45	28	4,617	70,459
Quebec.....	331	1,492	592	241	16,773	425	1,819	250	2,451	275	24,649	471,793
Ontario.....	318	607	744	1,279	23,220	467	1,788	321	5,897	636	35,777	1,136,388
Manitoba.....	21	64	79	8	2,506	33	92	72	558	33	3,466	77,468
Saskatchewan.....	24	85	9	8	2,501	28	61	15	451	63	3,245	59,710
Alberta.....	357	1,768	373	106	8,502	52	207	35	295	9	11,704	347,740
British Columbia.....	102	3,717	202	84	8,345	191	505	71	1,936	11	15,164	408,153
Yukon.....	1	2			15		2		1,965		986	12,977
N.W.T.....	14	11			49			17	259	30	380	15,127
Canada.....	1,314	7,886	2,070	2,240	80,435	1,262	4,977	870	13,167	1,168	115,389	3,003,421
By Industries—												
METAL MINING												
Alluvial Gold Mines.....	2	3	4	1	404	12	30	11	1,060	2	1,538	14,484
Auriferous Quartz Mines.....	194	344	103	237	18,117	408	2,653	97	6,032	455	28,640	934,514
Copper-Gold-Silver Mines.....	50	110	62	42	3,960	9	390	54	701	28	5,406	163,837
Silver-Cobalt Mines.....	9	1		1	175	4	46		57	8	301	7,721
Silver-Lead-Zinc Mines.....	12	3			1,147		9	2	358		1,531	50,124
Nickel-Copper Mines.....	18			274	5,280	3	1		257	4	5,837	199,399
Miscellaneous Metal Mines.....	43	5	19		37	1	32	8	52	6	203	2,748
Non-Ferrous Smelting and Re- fining.....	1	3,425	567	702	6,985	2	214	2	441	3	12,342	347,009
NON-METAL MINING, INCLUDING FUELS												
Coal.....	462	1,230	217	562	24,724	83	159	57	408	13	27,915	768,203
Natural gas.....	137	256	231	25	283	62	202	32	146	63	1,437	36,949
Petroleum.....	27	639	3	19	948	3	38	25	214	15	1,931	61,770
Other Non-Metal Mining—												
Asbestos.....	2	984		3	2,521	16	5		126	30	3,687	74,048
Feldspar and Quartz.....	10	21	13	12	141	14	50	4	109	18	392	7,554
Gypsum.....	10	11	51	3	323	8	67	55	141	34	703	13,685
Iron Oxides.....					21			10	23		54	343
Mica.....	7	6	10	1	19	40	10	20	19		132	1,191
Salt.....	7	42	63	10	137	14	9	6	140	38	466	9,225
Talc and Soapstone.....	4		7	12	2				49		74	876
Miscellaneous.....	9	45	18	1	104	4		7	117	83	388	8,966
CLAY PRODUCTS AND OTHER STRUCTURAL MATERIALS												
Cement.....	12	132	146	6	570		11		176	41	1,094	26,026
Clay Products.....	60	213	262	87	409	236	382	127	948	153	2,877	37,401
Lime.....	25	54	56	5	263	33	145	113	166	64	924	14,530
Sand and Gravel.....	26	102	25	7	12,810	34	24	177	433	54	13,692	180,801
Stone.....	187	260	213	230	1,055	276	500	63	985	56	3,825	42,017
Total.....	1,314	7,886	2,070	2,240	80,435	1,262	4,977	870	13,167	1,168	115,389	3,003,421

† Contains data on mining of silver-pitchblende ores in the Northwest Territories.

* Includes the actual money wages paid, the value of room and board, where provided, deductions from employees for social services, such as sickness, accident, insurance, pensions, etc., as well as any other allowances forming part of the employees' wages.

Table 16.—Employees and Salaries and Wages Paid in Canadian Mining Industry, 1929-1938

Year	Nova Scotia		New Brunswick		Quebec		Ontario		Manitoba		Saskatchewan	
	No.	\$	No.	\$	No.	\$	No.	\$	No.	\$	No.	\$
1929.....	14,738	21,035,230	1,361	12,36,726	19,678	16,886,275	24,924	34,897,624	1,819	2,375,990	1,421	1,139,373
1930.....	15,484	19,284,197	1,391	1,132,306	15,397	15,190,714	24,706	34,433,915	3,021	4,372,044	1,371	1,040,790
1931.....	14,871	15,302,444	1,197	1,048,860	11,141	12,666,586	20,277	30,470,475	2,059	3,096,332	1,092	896,131
1932.....	13,706	11,302,801	1,480	1,123,080	7,694	8,198,379	16,376	24,412,126	1,730	2,106,017	924	748,782
1933.....	13,915	9,852,765	1,629	1,402,114	8,629	8,621,984	17,306	25,600,168	1,379	1,847,251	1,265	1,111,001
1934.....	13,500	13,594,114	1,722	1,276,770	10,362	10,492,169	22,033	32,619,846	1,948	2,796,454	1,461	1,257,282
1935.....	14,550	14,301,510	2,390	1,865,407	11,811	12,794,600	25,264	38,152,140	2,346	3,403,649	1,457	1,343,041
1936.....	15,368	15,980,687	1,744	1,248,431	14,225	15,774,362	31,105	46,899,805	2,932	3,752,367	1,828	1,937,825
1937.....	15,629	18,373,958	3,012	1,509,063	19,121	22,708,131	36,238	58,891,339	3,159	4,301,366	2,307	2,372,443
1938.....	15,591	15,959,095	3,042	2,074,273	20,829	24,485,254	35,791	58,926,900	2,840	4,393,270	2,287	2,470,530

Year	Alberta		British Columbia		Yukon		Northwest Territories		Canada	
	No.	\$	No.	\$	No.	\$	No.	\$	No.	\$
1929.....	13,824	19,915,537	16,882	26,073,143	455	930,613	.....	.....	95,102	124,490,511
1930.....	12,675	16,272,916	14,836	21,412,925	319	835,525	.....	.....	89,200	113,975,332
1931.....	10,579	11,357,722	11,297	16,345,887	296	784,862	.....	.....	72,809	91,969,299
1932.....	9,692	10,476,449	9,565	12,612,151	286	761,585	17	30,679	61,470	71,772,049
1933.....	9,057	9,463,382	9,845	11,455,946	233	545,692	76	131,502	63,334	70,031,805
1934.....	9,843	9,792,297	12,270	15,482,102	286	660,814	80	154,338	73,505	88,126,186
1935.....	9,706	10,862,198	12,352	16,479,606	333	809,067	47	69,341	80,256	100,080,559
1936.....	10,376	11,850,463	12,827	17,908,553	566	1,372,917	28	40,812	90,999	116,766,222
1937.....	10,843	12,924,934	14,282	21,487,277	691	1,502,692	132	221,181	105,414	144,292,384
1938.....	10,612	12,811,975	15,179	21,975,143	794	1,962,941	310	584,619	107,275	145,644,000

Table 17.—Wage-Earners, Surface, Underground and Mill, 1938

Province	Metal Mines			Fuels			Other†		
	Surface (a)	Underground	Mill	Surface	Underground	Mill	Surface	Underground	Mill
Nova Scotia.....	118	281	54	2,132	11,460	.....	791	47	99
New Brunswick.....	.....	.....	.....	318	867	.....	1,706	40	25
Quebec.....	4,426	4,082	550	.....	.....	.....	7,930	494	1,611
Ontario.....	11,665	15,341	1,482	997	.....	.....	3,126	89	79
Manitoba.....	882	886	185	.....	5	.....	535	8	23
Saskatchewan.....	382	181	46	274	585	.....	560	.....	43
Alberta.....	.....	.....	.....	3,639	5,420	.....	575	.....	.....
British Columbia.....	5,552	3,775	923	912	1,921	.....	585	.....	14
Yukon.....	95	155	468	.....	2	.....	.....	.....	.....
Northwest Territories.....	206	53	5	5	.....	.....	.....	.....	.....
Total 1938.....	23,326	24,754	3,713	8,277	20,260	.....	15,808	678	1,894
Total 1937.....	23,608	23,400	3,350	8,204	20,330	.....	11,766	688	5,582
Total 1936.....	20,431	19,223	2,700	7,676	20,086	.....	8,618	155	4,506
Total 1935.....	16,854	16,049	2,454	7,217	19,463	.....	7,355	.....	4,368
Total 1934.....	15,348	13,935	1,907	7,143	19,245	.....	6,151	.....	3,746

† Includes asbestos, salt, gypsum, stone quarries, brick plants, etc., etc.

(a) Including non-ferrous smelters and refineries.

Table 18.—Fuel and Electricity Used for all Purposes

Industry	Bituminous		Anthracite coal		Lignite coal	Coke	Gasoline	Kerosene
	Canadian	Imported	From United States	From other countries				
	Tons	Tons	Tons	Tons	Tons	Tons	Imp. gal.	Imp. gal.
METAL MINING								
Alluvial Gold.....Quantity	2	4	.....	15	.....	10	99,327	941
\$	12	383	.....	963	.....	970	47,358	418
Auriferous Quartz.....Quantity	18,961	27,563	1,475	965	335	91	653,393	25,307
\$	169,929	272,020	19,347	16,943	1,842	1,604	204,922	6,804
Copper-Gold-Silver.....Quantity	9,283	10	252	.....	77,090	79	62,750	3,435
\$	78,488	188	4,449	.....	139,866	1,658	18,976	1,155
Silver-Cobalt.....Quantity	417	414	75	192	.....	.....	12,408	38
\$	7,748	3,797	1,190	3,077	.....	.....	2,861	9
Silver-Lead-Zinc.....Quantity	32,945	1	.....	.....	473	31	94,140	4,420
\$	137,560	25	.....	.....	2,910	226	43,390	1,401
Nickel-Copper.....Quantity	1,019	8,057	136	103	.....	.....	17,873	2,772
\$	6,462	52,400	1,771	1,643	.....	.....	3,972	549
Miscellaneous Metals.....Quantity	432	198	.....	.....	.....	.....	3,658	167
\$	2,431	1,240	.....	.....	.....	.....	961	42
Non-Ferrous Smelting and Refining. Quantity	504,956	184,584	.....	51	.....	291,317	104,255	7,448
\$	3,127,947	1,089,070	.....	821	.....	2,743,911	19,884	1,524
Total.....Quantity	568,015	220,831	1,935	1,326	77,898	291,528	1,050,004	44,528
 \$	3,530,577	1,419,123	26,757	23,417	144,618	2,748,369	342,324	11,902
NON-METAL MINING, INCLUDING FUELS								
Coal.....Quantity	539,015	.....	.....	.....	63,686	.....	96,414	3,470
\$	1,589,737	.....	.....	.....	61,107	.....	22,670	748
Natural Gas.....Quantity	.....	50	.....	.....	.....	4	58,006	50
\$	2,897	557	.....	.....	.....	50	10,737	11
Petroleum.....Quantity	3,002	6	.....	.....	.....	.....	36,131	.....
\$	17,005	67	.....	.....	.....	.....	7,426	.....
Total.....Quantity	542,589	56	.....	.....	63,686	4	190,551	3,520
 \$	1,609,639	624	.....	.....	61,107	50	40,833	769
Other Non-Metal Mining								
Asbestos.....Quantity	24,470	15	16,744	8,141	.....	50	97,937	5,948
\$	176,637	111	123,460	63,343	.....	606	21,641	1,050
Feldspar, nepheline syenite and Quartz. Quantity	901	3,856	.....	192	.....	2	36,334	664
\$	6,311	24,417	.....	10	.....	31	7,765	131
Gypsum.....Quantity	1,584	6,142	.....	.....	1,745	110	81,713	726
\$	12,103	32,920	.....	.....	6,769	1,391	17,741	146
Iron Oxides.....Quantity	33	.....	.....	18	.....	.....	862	66
\$	239	.....	.....	279	.....	.....	210	13
Mica.....Quantity	380	.....	.....	.....	.....	.....	7,594	256
\$	3,430	.....	.....	.....	.....	.....	1,671	63
Salt.....Quantity	8,671	42,855	.....	4,241	6,633	.....	4,450	160
\$	36,779	179,550	.....	18,820	21,833	.....	733	40
Talc and Soapstone.....Quantity	1	.....	.....	.....	.....	.....	4,280	25
\$	0	.....	.....	.....	.....	.....	933	6
Miscellaneous.....Quantity	2,321	11,850	15	96	13,151	.....	51,688	574
\$	10,623	75,553	221	775	33,649	.....	10,739	115
Total.....Quantity	38,361	64,718	16,759	12,506	21,529	162	284,358	8,419
 \$	246,131	312,551	123,681	83,409	62,251	2,028	61,433	1,564
STRUCTURAL MATERIALS AND CLAY PRODUCTS								
Cement.....Quantity	127,812	89,172	.....	.....	.....	.....	109,616	3,135
\$	656,187	499,812	.....	.....	.....	.....	21,699	577
Clay Products.....Quantity	24,635	67,090	2,694	17	505	391	49,679	1,050
\$	150,909	458,436	18,776	208	2,361	3,544	11,923	240
Lime.....Quantity	36,792	50,896	.....	21	80	12,545	38,694	30
\$	218,943	256,292	.....	116	299	89,834	8,885	9
Sand and Gravel.....Quantity	4,420	2,868	4,731	.....	.....	29	402,199	2,857
\$	23,850	19,094	27,665	.....	.....	302	73,626	635
Stone.....Quantity	3,662	7,521	241	.....	.....	10	429,039	23,869
\$	19,463	50,667	5,504	.....	.....	117	97,579	5,243
Total.....Quantity	197,321	217,547	7,666	38	585	12,975	1,029,227	30,941
 \$	1,069,352	1,284,301	51,945	324	2,660	93,797	213,712	6,704
Grand Total.....Quantity	1,346,286	503,152	26,363	13,870	163,698	304,669	2,554,640	87,408
 \$	6,455,639	3,016,599	292,383	107,180	270,636	2,844,244	658,302	20,929

† Explosives, chemicals, etc. (a) On outgoing shipments only. (b) Paid by mine operator only. (c) In addition cost of ores, etc., treated totalled \$173,070,377. (d) Data not available. (e) Cost includes service charges.

in the Mineral Industry in Canada, by Kinds and Industries, 1938

Fuel oil and diesel oil	Wood	Gas		Other fuel	Electricity purchased (e)	Total	Electricity generated for own use	Electricity generated for sale	Process supplies †	Freight (a)	Treatment charges (b)
		Manu- factured	Natural								
Imp. gal.	Cords	M cu. ft.	M cu. ft.	\$	K.W.H.	\$	K.W.H.	K.W.H.	\$	\$	\$
197,826	4,182						31,529,019	3,565,249			
49,865	35,096			8		135,073		25,666	113,549	12,086	27,662
6,282,606	95,906				741,866,953		80,584,889	1,020,530			
1,011,478	456,233			24	5,333,427	7,494,573		8,042	18,314,500	590,107	2,275,625
759,768	1,064				220,431,538		71,646,408		4,843,663	960,791	13,639,953
60,639	4,269			865	789,731	1,100,284					
5,836	636				6,033,150						
757	4,159				49,951	73,549					
660,496	1,699				65,160,604		6,940,919	29,080	248,347	41,391	82,783
183,746	23,120			13	310,180	702,571		11,295	1,694,121	1,781,756	889,805
172,924	20				106,501,272				4,746,780	(d)	(d)
16,922	80				343,658	427,457			6,131	26	
17,897	516				162,000		4,800				
2,316	1,757				2,002	10,749					
20,577,301	13,731	3,986		300	2,984,881,612		265,451,572				
1,083,969	70,143	5,085		297	7,088,569	15,233,547			11,900,435	(c)	
23,674,654	117,754	3,986			4,125,037,129		456,157,607	4,614,859			
2,499,692	594,857	5,085		297	13,917,518	25,177,803		45,003	41,867,526	3,386,157	16,915,828
				3,237							
63,594					117,623,850		45,383,343	10,392,843			
8,264					1,464,063	3,146,589		129,823	4,770,739		
3,559	53		112,525		15,876						
223	159		52,783		308	67,725			15,162		
506,313	1,031		4,722,822		1,892,454				802,982		
14,725	3,497		268,367		27,693	338,780					
573,466	1,084	4,855,347			119,632,180		45,383,343	10,392,843			
23,212	3,666	321,150			1,492,064	3,568,094		129,823	5,597,883		
43,026	59				106,249,990						
4,827	15				906,399	1,298,089			1,889,636		
221,351	391				1,179,566		1,175,813				
19,957	1,400				15,446	75,650			92,859		
87,448	102		25,900		4,461,800		1,397,511		90,157		
9,214	482		10,286		58,097	149,149			193		
	1,397				140,000						
	4,540				2,650	7,931		189,493			
	100										
	365					5,529			13,718		
78,582					2,123,280		3,731,534				
8,460					12,496	278,711			30,369		
5,243	26				1,121,875		9,000		7,914		
569	52				14,424	15,993					
2,125,709	3,007	118,555			3,289,219		1,038,578				
91,407	9,143	9,992		16	32,437	274,670			134,559		
2,561,859	5,082	118,555	25,900		118,565,730		7,541,929				
134,434	15,997	9,992	10,286	16	1,041,949	2,105,782			2,259,405		
18,521	50				40,535,200				529,157		
2,132	162				583,858	1,764,427					
51,340	36,079	16,528	532,374		9,939,962		612,411				
4,691	127,832	4,699	22,204	33	133,334	939,190			114,659		
304,496	55,465				7,807,485		1,312,711		113,759		
13,775	189,553				48,524	826,230					
43,428	132		47		2,905,397				65,795		
4,846	1,051		28		37,703	188,800					
144,093	2,471		3,600		16,775,204		179,434				
14,071	7,943		1,625	127	230,702	433,041			457,309		
561,878	94,197	16,528	535,921		77,963,248		2,104,556				
39,515	326,541	4,699	23,857	160	1,034,121	4,151,688			1,280,679		
32,371,357	218,117	139,069	5,397,468		4,441,098,287		511,187,435	15,007,702			
2,606,853	941,051	19,776	355,590	3,413	17,485,652	34,988,307		174,826	51,005,493	3,386,157	16,915,828

Table 19.—Fuel and Electricity Used for all Purposes

Province	Bituminous		Anthracite coal		Lignite coal	Coke	Gasoline	Kerosene
	Canadian	Imported	From United States	From other countries				
	Tons	Tons	Tons	Tons	Tons	Tons	Imp. gal.	Imp. gal.
Nova Scotia.....	Quantity 357,813	2		9		2,948	105,702	1,658
	\$ 1,174,944	12		141		16,890	23,340	314
New Brunswick.....	Quantity 5,371	4,956					9,141	
	\$ 22,658	25,376					2,177	
Quebec.....	Quantity 268,671	43,124	18,509	8,570		4,308	556,614	33,296
	\$ 1,786,972	320,708	141,592	70,340		44,454	133,839	7,620
Ontario.....	Quantity 264,511	454,837	7,667	5,110		229,066	1,180,943	34,896
	\$ 1,606,059	2,666,014	56,762	33,170		2,163,717	254,727	7,767
Manitoba.....	Quantity 53,557	9	60		8,654	137	136,128	862
	\$ 390,944	94	1,129		29,241	1,824	44,593	241
Saskatchewan.....	Quantity 21,808	62	30	96	47,265	13	135,950	360
	\$ 149,971	501	556	775	68,039	214	43,013	109
Alberta.....	Quantity 133,932				29,881		59,252	3,861
	\$ 370,938				28,738		13,975	842
British Columbia.....	Quantity 240,602	161	97	70	77,898	68,137	233,627	11,296
	\$ 951,537	3,714	2,344	1,791	144,618	616,175	67,781	3,415
Yukon.....	Quantity 11	1		15		10	121,053	1,023
	\$ 1,024	180		963		970	65,203	498
N.W.T.....	Quantity 10						16,230	156
	\$ 652						9,654	123
Canada.....	Quantity	503,152	26,363	13,870	163,698	304,669	2,554,640	87,408
	\$ 6,455,699	3,016,599	202,383	107,180	270,636	2,844,244	658,302	20,929

(a) On outgoing shipments and paid by mine operator.

(b) Paid by mine operator only.

Table 20.—Fuel and Electricity Used only for Metallurgical

Province	Bituminous coal		Anthracite coal		Lignite coal	Coke
	Canadian	Imported	From United States	From other countries		
	Tons	Tons	Tons	Tons	Tons	Tons
Quebec.....	Quantity 114,456	96				3,991
	\$ 879,685	724				41,044
Ontario.....	Quantity 239,248	154,483				218,988
	\$ 1,417,644	900,787				2,085,606
Manitoba.....	Quantity 34,389					
	\$ 245,883					
Saskatchewan.....	Quantity 17,195					
	\$ 122,942					
British Columbia.....	Quantity 87,287					68,020
	\$ 404,175					613,980
Canada.....	Quantity	154,579				290,999
	\$ 3,070,329	901,511				2,740,630

* All used in the non-ferrous smelting and refining industry and included in table 19.

in the Mineral Industry in Canada, by Provinces, 1938

Fuel oil and diesel oil	Wood	Gas		Other fuel	Electricity purchased (e)	Total	Electricity generated for own use	Electricity generated for sale	Process supplies †	Freight (a)	Treatment charges (b)
		Manu- factured	Natural								
Imp. gal.	Cords	M cu. ft.	M cu. ft.	\$	K.W.H.	\$	K.W.H.	K.W.H.	\$	\$	\$
393,406 42,641	5,109 12,558	118,555 9,992	.....	4	87,860,564 1,095,380	2,376,216	27,688,311	7,079,512 57,377	2,868,050	2,889	11,401
2,909 145	10,523 35,884	.....	30,960 15,020	.....	1,443,978 31,946	133,206	693,951	.....	140,772	.....	.....
8,157,881 539,727	61,330 247,118	2,973 3,002	.....	143	1,968,370,948 6,068,813	9,364,328	267,538,852	.....	11,042,695	415,446	10,505,191
15,517,978 1,057,421	82,692 353,102	17,541 6,782	108,178 51,104	2,327	1,237,354,301 6,090,971	14,349,923	21,679,469	.....	24,392,573	154,701	1,243,507
449,959 80,986	16,759 74,616	.....	.....	580	237,079,679 386,429	1,010,677	14,797,256	859,130 4,295	1,888,452	286,746	1,623,526
2,277,679 121,041	4,562 33,115	.....	2,164 217	285	103,139,147 120,224	538,060	1,679,542	.....	652,848	.....	469,260
504,438 14,593	1,601 5,849	.....	5,254,666 288,914	.....	30,391,006 371,974	1,095,823	7,912,733	556,220 28,094	1,871,446	.....	.....
4,317,997 490,604	28,978 108,221	.....	.....	74	775,450,604 3,319,649	5,709,923	136,995,801	2,977,732 48,990	7,340,925	2,129,820	2,692,058
519,872 184,535	3,445 42,942	.....	.....	.....	.....	296,315	31,365,950	3,535,108 36,070	517,521	395,717	368,060
229,238 75,160	3,118 27,646	.....	1,500 335	.....	8,060 266	113,836	835,570	.....	290,211	838	2,825
32,371,357 2,606,853	218,117 941,051	139,069 19,776	5,397,468 355,590	3,413	4,441,098,287 17,485,652	34,988,307	511,187,435	15,007,702 174,826	51,005,493	3,386,157	16,915,828

Purposes in the Mineral Industry of Canada, by Provinces, 1938*

Gasolene	Kerosene	Fuel oil and diesel oil	Wood	Gas		Other fuel	Electricity purchased	Total	Electricity generated for own use
				Manu- factured	Natural				
Imp. gal.	Imp. gal.	Imp. gal.	Cords	M cu. ft.	M cu. ft.	\$	K.W.H.	\$	K.W.H.
8,416 2,262	1,137 270	6,391,214 302,255	5,046 24,782	2,973 3,002	.....	.....	1,500,722,953 2,789,679	4,043,703	234,906,198
5,118 1,039	293 59	13,033,316 651,040	7,910 40,652	1,013 2,083	300 297	.....	174,700,934 517,176	5,618,710	.....
.....	.....	6,090 1,096	43 200	.....	.....	.....	101,713,000 63,540	310,719	.....
.....	.....	3,045 548	21 100	.....	.....	.....	50,856,000 31,770	155,360	.....
.....	.....	966,115 111,202	711 4,409	.....	.....	.....	.....	1,133,766	.....
13,534 3,301	1,430 329	20,399,780 1,066,141	13,731 70,143	3,986 5,085	300 297	2,327	1,827,992,887 3,402,165	11,262,258	234,906,198

Table 21.—Electricity Purchased by

Year	Auriferous Quartz Mining (gold mines)		Total All Metal Mines (including non-ferrous smelters and refineries)		Total, entire mining industry	
	K.W.H.	\$*	K.W.H.	\$*	K.W.H.	\$*
1925.....	160,192,738	1,413,861	612,062,882	3,542,342	944,819,733	6,927,280
1926.....	169,287,220	1,547,152	1,215,488,195	4,992,979	1,604,089,435	8,780,863
1927.....	221,866,174	1,742,860	1,490,457,194	5,509,534	1,799,505,643	8,025,375
1928.....	224,756,744	2,002,062	1,530,612,608	6,271,434	1,856,391,170	9,072,073
1929.....	233,219,275	1,983,959	1,662,142,083	6,934,286	2,054,411,658	10,353,034
1930 (a).....	213,116,298	1,927,268	1,752,490,909	7,535,324	2,151,082,619	10,929,340
1931 (b).....	253,436,606	2,222,870	1,874,324,568	7,909,118	2,213,264,599	10,514,814

* Includes service charges.

(a) 1925 to 1930 for power only.

(b) 1931-1938 for all purposes.

Table 22.—Power Equipment in Use, and Power Equipment in
ORDINARILY IN USE

Province	Steam engines and turbines	Diesel engines	Gasolene, gas and oil engines other than diesel engines	Hydraulic turbines or water wheels	Total primary power	Electric motors run by purchased power	Total power employed	Electric motors run by primary power in same plant	Boilers
Nova Scotia..... No.	56	35	74	2	167	741	908	246	126
H.P.	48,353	4,288	2,442	530	55,613	51,896	107,509	16,157	33,460
New Brunswick..... No.	18	.....	33	.....	51	159	210	15	13
H.P.	1,609	.....	1,036	.....	2,645	1,739	4,384	245	920
Quebec..... No.	66	61	178	14	319	5,934	6,253	478	116
H.P.	5,789	8,326	6,550	51,695	72,360	199,372	271,722	5,453	11,839
Ontario..... No.	166	75	453	5	699	10,271	10,970	832	264
H.P.	14,224	9,124	15,408	1,150	39,906	382,964	422,870	9,952	29,364
Manitoba..... No.	14	12	29	1	56	1,322	1,378	194	35
H.P.	1,242	2,210	866	1,900	6,218	70,652	76,870	3,114	8,164
Saskatchewan..... No.	29	25	37	.....	91	614	705	64	17
H.P.	2,010	1,921	1,113	.....	5,044	31,607	36,651	705	4,598
Alberta..... No.	226	4	104	.....	334	1,298	1,632	283	234
H.P.	41,841	287	4,189	.....	46,317	39,923	86,240	8,818	27,075
British Columbia..... No.	84	118	131	57	390	3,864	4,254	1,050	92
H.P.	30,065	13,649	3,263	36,130	83,107	175,779	258,886	34,696	17,826
Yukon..... No.	.....	17	2	2	21	.....	21	318	2
H.P.	.....	2,754	45	10,000	12,799	.....	12,799	13,968	32
N.W.T..... No.	.....	6	3	.....	9	1	10	73	5
H.P.	.....	1,257	100	.....	1,367	5	1,362	635	175
Canada..... No.	659	353	1,044	81	2,137	24,204	26,341	3,553	904
H.P.	145,133	43,816	35,012	101,405	325,366	953,927	1,279,293	93,743	133,453

Canadian Mining Industry, 1925-1938

Year	Auriferous Quartz Mining (gold mines)		Total All Metal Mines (including non-ferrous smelters and refineries)		Total, entire mining industry	
	K.W.H.	\$*	K.W.H.	\$*	K.W.H.	\$*
1932.....	314,326,323	2,516,897	1,499,911,795	6,626,600	1,758,083,427	9,615,706
1933.....	317,550,168	2,661,852	1,688,075,040	7,115,894	1,908,779,501	9,966,904
1934.....	415,570,129	3,091,147	2,099,586,731	8,433,428	2,359,525,280	11,010,481
1935.....	464,146,582	3,722,163	2,320,385,917	9,415,062	2,591,470,745	12,546,298
1936.....	449,026,003	4,345,066	2,841,045,187	10,783,296	3,151,192,519	14,055,915
1937.....	629,083,378	5,031,691	3,368,047,901	12,442,423	3,744,919,549	16,135,702
1938.....	741,866,953	5,333,427	4,125,037,129	13,917,518	4,441,098,287	17,485,652

Reserve or Idle, in the Mineral Industry in Canada, by Provinces, 1938

IN RESERVE OR IDLE

Steam engines and turbines	Diesel engines	Gasolene, gas and oil engines other than diesel engines	Hydraulic turbines or water wheels	Total primary power	Electric motors run by purchased power	Total power employed	Electric motors run by primary power in same plant	Boilers
13	3	13	2	31	15	46	8	14
4,112	44	496	70	4,722	398	5,120	847	2,265
6		3		9	7	16	1	4
192		55		247	133	380	30	145
15	11	42		68	431	499	19	34
749	1,760	2,283		4,792	18,753	23,545	570	3,810
45	15	64		124	720	844	48	37
3,858	1,134	3,424		8,416	39,332	47,748	816	3,198
3	2	20		25	116	141	6	6
1,491	450	1,445		3,386	3,088	6,474	27	946
8	2	8		18	39	57	1	6
1,659	725	506		2,890	1,034	3,924	150	650
34	4	13		51	49	100	5	17
7,349	20	1,131		8,600	1,934	10,434	170	2,295
11	35	34	24	104	594	698	109	18
3,431	3,731	596	3,463	11,221	15,583	26,804	2,621	1,756
					36	36	29	1
					3,828	3,828	352	150
	3	1		4		4	1	2
	399	3		402		402	5	90
135	75	198	26	434	2,007	2,441	227	139
22,841	8,263	9,939	3,533	44,576	84,083	128,659	5,588	15,335

Table 23.—Power Equipment in Use, and Power Equipment in
ORDINARILY IN USE

Province	Steam engines and turbines	Diesel engines	Gasolene, gas and oil engines other than diesel engines	Hydraulic turbines or water wheels	Total primary power	Electric motors run by purchased power	Total power employed	Electric motors run by primary power in same plant	Boilers
METAL MINING—									
Alluvial Gold Mines..... No. H.P.	2 34	29 2,891	69 1,506	7 11,682	107 16,113	.....	107 16,113	299 15,892	6 192
Auriferous Quartz Mines..... No. H.P.	43 2,362	162 24,370	189 6,526	30 14,957	424 48,215	7,682 222,602	8,106 270,817	1,486 20,055	215 17,048
Copper-Gold-Silver Mines..... No. H.P.	4 10,380	4 1,060	9 252	11 9,909	28 21,601	1,829 68,785	1,857 90,386	255 11,587	23 11,249
Silver-Cobalt Mines..... No. H.P.	.....	.....	4 20	.....	4 20	54 1,790	58 1,810	1 50	3 200
Silver-Lead-Zinc Mines..... No. H.P.	4 6,025	38 4,061	14 265	2 412	58 10,763	735 21,051	793 31,814	91 1,077	10 2,306
Nickel-Copper Mines..... No. H.P.	.....	.....	.....	.....	.....	785 46,914	785 46,914	.....	4 327
Miscellaneous Metal Mines..... No. H.P.	1 15	10 578	3 12	.....	14 605	.....	14 605	1 2	3 100
Non-ferrous Smelting and Refining..... No. H.L.	25 9,421	.....	10 437	11 51,125	46 60,983	6,319 315,574	6,365 376,557	430 5,750	31 19,108
Total..... No. H.P.	79 28,237	243 32,960	298 9,018	61 88,085	681 158,300	17,404 676,716	18,085 835,016	2,563 54,413	295 50,530
NON-METAL MINING, INCLUDING FUELS—									
Coal..... No. H.P.	263 80,374	10 609	103 1,844	2 12,000	378 94,827	2,114 92,242	2,492 187,069	525 31,891	287 55,876
Natural Gas..... No. H.P.	12 385	.....	197 5,986	.....	209 6,371	28 678	237 7,049	13 202	4 165
Petroleum..... No. H.P.	96 22,760	4 287	75 3,937	.....	169 26,984	124 653	293 27,637	14 332	100 10,473
Total..... No. H.P.	365 103,519	14 896	375 11,767	2 12,000	756 128,182	2,266 93,573	3,022 221,755	552 32,425	391 66,514
Other Non-Metal Mining									
Asbestos..... No. H.P.	7 235	2 220	5 366	.....	14 821	1,087 51,668	1,101 52,489	.....	9 450
Feldspar, nepheline-syenite and Quartz No. H.P.	8 572	6 957	15 940	.....	29 2,469	55 995	84 3,464	91 791	36 1,050
Gypsum..... No. H.P.	5 915	15 1,956	40 1,626	.....	60 4,497	181 6,126	241 10,623	36 884	7 545
Iron oxides..... No. H.P.	.....	.....	.....	.....	.....	6 76	6 76	.....	1 30
Mica..... No. H.P.	4 94	.....	9 260	1 145	14 499	.....	14 499	3 115	1 50
Salt..... No. H.P.	26 2,656	3 555	2 22	.....	31 3,233	94 799	125 4,032	141 1,708	9 3,800
Talc and Soap-stone..... No. H.P.	.....	3 267	5 92	.....	8 359	22 444	30 803	12 118	.....
†Miscellaneous..... No. H.P.	3 65	9 882	14 450	2 150	28 1,647	108 2,622	136 4,169	43 579	5 250
Total..... No. H.P.	53 4,537	38 4,837	90 3,756	3 295	184 13,425	1,553 62,730	1,737 76,155	326 4,195	68 6,175

† Includes data for peat.

Reserve or Idle, in the Mineral Industry in Canada, by Industries, 1938

IN RESERVE OR IDLE

Steam engines and turbines	Diesel engines	Gasolene, gas and oil engines other than diesel engines	Hydraulic turbines or water wheels	Total primary power	Electric motors run by purchased power	Total power employed	Electric motors run by primary power in same plant	Boilers
	2	12		14	36	50		
	14	148		162	3,828	3,990		
27	43	86	10	166	483	649	71	46
1,698	4,974	5,488	1,903	14,063	15,523	29,586	1,781	2,756
6	4	21		31	124	155	22	10
2,895	452	1,367		4,714	3,547	8,261	985	1,376
3				3	1	4		2
235				235	2	237		100
	7	3	7	17	100	117	81	6
	970	80	600	1,650	4,915	6,565	1,077	430
			2	2	47	49		
			720	720	954	1,674		
2	1			3	18	21		
50	120			170	215	385		
3				3	713	716	36	6
1,134				1,134	34,930	36,064	408	2,067
41	57	122	19	239	1,522	1,761	210	70
6,012	6,530	7,083	3,223	22,848	63,914	86,762	4,251	6,729
47		13		60	35	95	7	30
12,752		342		13,094	979	14,073	962	5,244
1		10		11		11		
35		269		304		304		
4		9		13	8	21	4	6
376		985		1,361	44	1,405	155	400
52		32		84	43	127	11	36
13,163		1,596		14,759	1,023	15,782	1,117	5,704
2		2		4	30	34		2
225		10		235	3,175	3,410		150
1		4		5		5		1
25		86		111		111		25
3		5		8	40	48		1
240		307		547	1,362	1,909		100
		1		1		1		
		21		21		21		
4	1	2		7	2	9	3	4
78	25	9		112	41	153	50	600
					5	5		
					190	190		
1	2	2		5	13	18		1
400	725	15		1,140	473	1,613		250
11	3	16		30	90	120	3	9
998	750	448		2,166	5,241	7,407	50	1,125

Table 23.—Power Equipment in Use, and Power Equipment in
ORDINARILY IN USE

Province	Steam engines and turbines	Diesel engines	Gasoline, gas and oil engines other than diesel engines	Hydraulic turbines or water wheels	Total primary power	Electric motors run by purchased power	Total power employed	Electric motors run by primary power in same plant	Boilers
CLAY PRODUCTS AND OTHER STRUCTURAL MATERIALS—									
Cement.....No.	2	2	31	.....	35	1,312	1,347	10	11
H.P.	57	535	1,359	.....	1,951	74,893	76,844	756	392
Clay Products...No.	52	4	43	.....	99	517	616	27	59
H.P.	4,567	495	1,160	.....	6,222	14,280	20,502	404	5,384
Lime.....No.	8	4	15	.....	27	265	292	46	18
H.P.	165	376	499	.....	1,040	5,031	6,071	717	1,352
Sand and Gravel..No.	21	13	50	7	91	152	243	.....	13
H.P.	1,109	1,020	2,282	240	4,651	5,631	10,282	.....	970
Stone.....No.	79	35	142	8	264	735	999	29	49
H.P.	2,942	2,697	5,171	785	11,595	21,073	32,668	833	2,136
Total.....No.	162	58	281	15	516	2,981	3,497	112	150
H.P.	8,840	5,123	10,471	1,025	25,459	120,908	146,367	2,710	10,234
Grand total 1938...No.	659	353	1,044	81	2,137	24,204	26,341	3,553	904
H.P.	145,133	43,816	35,012	101,405	325,366	953,927	1,279,293	93,743	133,453
Grand total 1937...No.	774	359	1,022	99	2,254	21,691	23,945	3,563	1,009
H.P.	140,831	44,057	32,508	92,212	309,608	903,484	1,213,092	105,856	141,144

Reserve or Idle, in the Mineral Industry in Canada, by Industries, 1938—Concluded

IN RESERVE OR IDLE

Steam engines and turbines	Diesel engines	Gasolene, gas and oil engines other than diesel engines	Hydraulic turbines or water wheels	Total primary power	Electric motors run by purchased power	Total power employed	Electric motors run by primary power in same plant	Boilers
2		4		6	168	174		4
50		267		317	7,094	7,411		164
10	8	10		28	54	82	2	6
1,389	890	218		2,497	2,358	4,855	140	475
		4		4	14	18	1	1
		20		20	500	520	30	75
2	7	1		10	11	21		1
82	93	65		240	130	420		70
17		9	7	53	105	138		12
1,177		242	310	1,729	3,773	5,502		993
31	15	28	7	81	352	433	3	24
2,698	983	812	310	4,803	13,905	18,708	170	1,777
135	75	198	26	434	2,007	2,441	227	139
22,841	8,263	9,939	3,533	44,576	84,083	128,659	5,588	15,335
125	62	193	15	395	1,552	1,947	329	165
21,868	6,785	8,471	1,488	38,612	56,459	95,071	7,535	16,879

Table 24.—Mining Accidents in 1938

Cause of Accident	Nova Scotia		New Brunswick		Quebec		Ontario		Manitoba		Saskatchewan		Alberta		British Columbia		Canada	
	Fatal	Non-Fatal	Fatal	Non-Fatal	Fatal	Non-Fatal	Fatal	Non-Fatal	Fatal	Non-Fatal	Fatal	Non-Fatal	Fatal	Non-Fatal	Fatal	Non-Fatal	Fatal	Non-Fatal
UNDERGROUND—																		
Falls of roof or face.....	7	676	.....	102	7	157	16	89	3	83	1	76	5	82	8	249	47	1,514
Mine cars and locomotives..	34	462	.....	54	.....	126	2	.....	1	41	1	70	4	30	.....	140	42	923
Gas and dust explosions.....	.....	2	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	7	7	3	12	10	21
Explosives.....	2	4	.....	6	6	17	13	28	.....	.....	1	5	2	5	.....	9	24	74
Electricity.....	.....	.....	.....	2	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1	.....	3
Miscellaneous.....	1	1,141	.....	150	11	565	18	1,374	2	140	.....	191	1	54	10	1,371	43	4,986
Total.....	44	2,285	.....	314	24	865	49	1,491	6	264	3	342	19	178	21	1,782	166	7,521
SURFACE—																		
Haulage.....	.....	33	.....	7	.....	74	1	10	.....	13	.....	51	.....	2	.....	31	1	221
Machinery.....	.....	16	.....	9	4	195	3	52	.....	24	.....	9	.....	.....	1	32	8	337
Miscellaneous.....	.....	192	.....	26	21	724	8	594	1	100	.....	162	1	28	1	587	32	2,413
Total.....	.....	241	.....	42	25	993	12	656	1	137	.....	222	1	30	2	650	41	2,971
Grand Total 1938	44	2,526	.....	356	49	1,858	61	2,147	7	401	3	564	20	208	23	2,432	207	10,492
Grand Total 1933	12	783	.....	208	8	349	25	1,513	.....	.....	4	267	6	169	14	1,061	69	4,350
Grand Total 1928	23	2,572	2	224	24	416	85	2,515	.....	.....	1	34	28	193	28	1,988	196	7,945

CHAPTER TWO

THE GOLD MINING INDUSTRY IN CANADA

Including—(a) The Alluvial Gold Mining Industry; (b) The Auriferous Quartz Mining Industry; (c) The Copper-Gold-Silver Mining Industry; (d) Miscellaneous Data on Monetary Gold and World Gold Production, Prices, Exchange, etc.

Definition of the Industry.—Gold mining in Canada is classified into three principal industries—(a) the recovery of gold from the gravels and sands of stream channels or beaches or what is defined as “The Alluvial Gold Mining Industry”; (b) the recovery of lode gold, which is named “The Auriferous Quartz Mining Industry” and in which industry the gold is usually the most important economic constituent of the ores mined and quartz the predominant gangue mineral; (c) gold is often found in various other mineral deposits, more particularly in those of copper, and for this reason the review of Canada’s “Copper-Gold-Silver Mining Industry” is included here to complete a more comprehensive survey of the Canadian Gold Mining Industry.

Gold Clauses Act, 1939

A new Gold Clauses Act was passed during the 1939 session repealing the 1937 Act and re-enacting its main provisions with certain additions giving greater certainty to the principles embodied in the 1937 legislation. A copy of the new Act follows:—

1. This Act may be cited as The Gold Clauses Act, 1939.

2. The expression “gold clauses obligation” in this Act means any obligation heretofore or hereafter incurred (including any such obligation which has, at any time heretofore or hereafter, matured or been repudiated) which purports to give to the creditor a right to require payment in gold or in gold coin or in an amount of money measured thereby, and includes any such obligation of the Government of Canada or of any province.

3. The provisions of this Act shall have full force and effect notwithstanding anything contained in any other statute or law.

4. In an action in Canada upon a gold clause obligation,

(i) tender in currency which is legal tender in the country in the money of which the obligation is or becomes payable, of the nominal or face amount of the obligation, or,

(ii) tender in currency which is legal tender where the tender is made of an amount which is equivalent to the nominal or face amount of the obligation,

shall be a legal tender if such tender was made at the place at which the obligation was payable by the terms of the contract whether such tender was made before or after the commencement of such action, and the debtor shall, if he has made payment in accordance with such tender, be entitled to a discharge of the obligation or of any liability for damages by reason of repudiation of liability upon such obligation.

5. In an action in Canada upon a foreign judgment rendered in an action commenced after the date of the commencement of this Act upon a gold clause obligation,

(i) tender in currency which is legal tender in the country in the money of which such obligation is or becomes payable, of the nominal or face amount of such obligation, or

(ii) tender in currency which is legal tender where the tender is made of an amount which is equivalent to the nominal or face amount of such obligation,

shall be a legal tender if such tender was made at the place at which the obligation was payable by the terms of the contract and before the foreign action was commenced, and the debtor shall, if he has made payment in accordance with such tender, be entitled to a discharge of such judgment.

6. Any payment in respect of a gold clause obligation made before the commencement of this Act, which, if made hereafter, would entitle the debtor to a discharge, shall be deemed to have discharged the obligation.

7. Every provision in any obligation heretofore or hereafter incurred, which purports to give to the creditor a right to require payment in gold or in gold coin, or in an amount of money measured thereby, is hereby declared to be contrary to public policy, and every obligation containing such a provision shall have effect as if such provision were not contained therein, and as if it contained a covenant to pay its nominal or face amount in currency which is legal tender in the country in the money of which the obligation is payable, or its equivalent in Canadian currency.

8. Every gold clause obligation secured on or enforceable against any work or undertaking subject to the legislative authority of the Parliament of Canada shall be construed as if it contained no reference to gold or gold coin and as if the only amount stipulated to be paid thereunder were its nominal or face amount in currency which is legal tender in the country in the money of which the obligation is payable or its equivalent in Canadian currency.

9. In respect of any gold clause obligation, the Exchequer Court of Canada shall not pronounce or enforce any judgment, order or decree wherein the amount of the liability is fixed for any purpose whatsoever at more than the nominal or face value of such obligation in currency which is legal tender in the country in the money of which such obligation is payable or its equivalent in Canadian currency.

10. Sections four and five, section seven, section eight, and section nine, shall have effect as though contained in separate statutes and shall apply to all obligations wherever payable.

11. The Gold Clauses Act, 1937, chapter thirty-three of the statutes of 1937, is hereby repealed.

Order in Council P.C. 476, March 3, 1939

WHEREAS subsection one of section twenty-five of the Bank of Canada Act, Chapter forty-three of the Statutes of Canada, 1934, provides that the Bank shall sell gold to any person who makes demand therefor at the head office of the Bank and tenders the purchase price in legal tender, but only in the form of bars containing approximately four hundred ounces of fine gold;

AND WHEREAS by Order in Council P.C. 426, dated March 1, 1938, passed under the provisions of subsection two of said section twenty-five of the said Act, the operation of said subsection one of section twenty-five was suspended for a period of one year from and after March 10, 1938.

NOW, THEREFORE, His Excellency the Governor General in Council, on the recommendation of the Minister of Finance and under the provisions of said subsection two of section twenty-five of the Bank of Canada Act is pleased to order that the operation of said subsection one of section twenty-five be and it is hereby suspended for a further period of one year from and after the tenth day of March, 1939, unless sooner rescinded by Order in Council.

Income Tax Exemption to New Mines

In the 1939 session of Parliament an amendment to the Income Tax Act extended for a further three years the qualifying period for the three-year exemption from January 1, 1940, to January 1, 1943. Provision was also made for an exemption from tax in respect of dividends paid to a company incorporated in Canada by a company which has never paid a tax by reason of the above three-year exemption. It might be explained that under the Income Tax Act a corporation is exempt from tax on dividends received from another corporation if the paying corporation has already paid corporation income tax on its earnings. This is to avoid double taxation of corporate earnings. It is seen, therefore, that but for the exempting amendment here mentioned a receiving corporation would automatically lose the exemption (which it would otherwise enjoy) through the fact that the paying corporation had received the three-year exemption accorded to new mines and thus the purpose of the Government in allowing the three-year exemption would be defeated.

The above mentioned three-year exemption from income tax has been and is available only to new or reopened mines. The 1939 income tax amendments, however, now offer an important and far reaching tax credit to the mining industry as a whole under provisions which are applicable generally to all taxpayers. Briefly stated the new provisions offer a credit against income tax up to 10 per cent of any capital expenditure undertaken by the taxpayer in the period May 1, 1939 to April 30, 1940, the credit to be taken in three equal annual instalments. The full text of the tax credit amendment (Bill 142) is contained in the Dominion Bureau of Statistics' "Summary Review of the Gold Mining Industry in Canada, 1938."

Table 25.—Production of New Gold in Canada, by Provinces and Sources, 1937 and 1938

(Gold at \$20·671834 per fine ounce)

	1937		1938	
	Fine troy ounces	\$	Fine troy ounces	\$
NOVA SCOTIA—				
In gold bullion shipped and ores exported.....	19,918	411,742	26,560	549,044
Estimated exchange equalization on gold produced.....		285,189		385,204
Total Value—Canadian Funds.....		696,931		934,248
QUEBEC—				
In anode copper, in ores shipped and in gold bullion produced.....	711,480	14,707,596	881,263	18,217,322
Estimated exchange equalization on gold produced.....		10,187,089		12,781,104
Total Value—Canadian Funds.....		24,894,685		30,998,426
ONTARIO—				
†Porcupine Area—In gold bullion produced.....	1,120,525	23,163,306	1,258,671	26,019,038
†Kirkland Lake—In gold bullion produced (a).....	999,446	20,660,382	1,030,829	21,309,126
†Other gold mines—In gold bullion produced.....	391,674	8,096,620	526,750	10,888,889
Copper-nickel and other ores.....	75,450	1,559,690	80,227	1,658,439
Total.....	2,587,095	53,479,998	2,896,477	59,875,492
Estimated exchange equalization on gold produced.....		37,042,456		42,008,086
Total Value—Canadian Funds.....		90,522,454		101,883,578
MANITOBA—				
In gold bullion produced, ores shipped and in blister copper shipped.....	157,949	3,265,096	185,706	3,838,884
Estimated exchange equalization on gold produced.....		2,261,540		2,693,325
Total Value—Canadian Funds.....		5,526,636		6,532,209
SASKATCHEWAN—				
In ores shipped to Canadian smelters and crude gold shipped.....	65,886	1,361,984	50,021	1,034,026
Estimated exchange equalization on gold produced.....		943,367		725,463
Total Value—Canadian Funds.....		2,305,351		1,759,489
ALBERTA—				
In alluvial gold.....	46	951	305	6,305
Estimated exchange equalization on gold produced.....		659		4,423
Total Value—Canadian Funds.....		1,610		10,728
BRITISH COLUMBIA—				
In alluvial gold.....	43,322	895,545	46,207	955,183
In gold bullion produced.....	254,996	5,271,235	324,031	6,698,315
In base bullion and in matte and ores exported.....	207,539	4,290,212	235,379	4,865,716
Total.....	505,857	10,456,992	605,617	12,519,214
Estimated exchange equalization on gold produced.....		7,242,944		8,783,364
Total Value—Canadian Funds.....		17,699,936		21,302,578
YUKON—				
In alluvial gold.....	46,679	964,941	71,303	1,473,964
In ores shipped.....	1,303	26,935	1,065	22,015
Total.....	47,982	991,876	72,368	1,495,979
Estimated exchange equalization on gold produced.....		687,014		1,049,565
Total Value—Canadian Funds.....		1,678,890		2,545,544
NORTHWEST TERRITORIES—				
In ores shipped.....			6	124
In gold bullion produced.....			6,794	140,444
Total.....			6,800	140,568
Estimated exchange equalization on gold produced.....				98,622
Total Value—Canadian Funds.....				239,190
Total for Canada.....	4,096,213	84,676,235	4,725,117	97,676,834
Total estimated exchange equalization on gold produced.....		58,650,258		68,529,156
Grand Total Gross Value, including Exchange.....		143,326,493		166,205,990

In 1938 the estimated average price of a troy ounce of fine gold, in Canadian funds, was \$36·175; in 1937 the corresponding price was \$34·99.

† Includes relatively small amounts of gold contained in slags, and ore shipped.

(a) Includes production in Larder Lake area.

Table 26.—Production of Gold in Canada, by Principal Mines, 1938

Property and Province	Ore raised	Material sorted (discarded)	Ore treated	Gold production	Mill capacity 24 hours	See footnotes
	Tons	Tons	Tons	Fine oz.	Tons	
NOVA SCOTIA						
Avon Gold Mines, Ltd.	11,500	5,793	5,707	1,185	40	(a)
Aulénback Mine	13	40	13	12	8	(a)
Consolidated Mining & Smelting Co. of Canada, Ltd.	8,312	8,995	8,296	3,916	40	(a)
Culode Mine	200	1,000	100	30	20	(a)
Guysborough Mines, Ltd.	38,938	7,809	31,129	6,999	100	(a)
Horne Gold Mines, Ltd.	180		180	27	15	(a)
Montague Gold Mines Ltd.	42,222	9,902	32,305	6,165	95	(a) (c)
Nugold Mining Corp. Ltd.	640		745	86	24	(a) (b)
Seal Harbour Gold Mines Ltd.	83,595		83,595	7,590	200	(a) (c)
Other mines, including exports				550		
Total—Nova Scotia				(d) 26,560		

FOOTNOTES—

- (a) Amalgamation.
 (b) In addition, 14 tons of concentrates were made and stored.
 (c) Cyanidation.
 (d) Receipts at Royal Canadian Mint plus gold in ores exported.

QUEBEC						
Amm Gold Mines (Quebec) Ltd.	100		Test.	35	2	(a)
Arntfield Gold Mines Ltd.	97,982		95,259	9,961	400	(c)
Beattie Gold Mines (Quebec) Ltd.	606,040		606,040	67,213	1,500	(c)
Belleterre Quebec Mines Ltd.	28,395	1,517	26,878	5,773	175	(c)
Canadian Malartic Gold Mines Ltd.	243,640		243,640	32,122	700	(c)
Cournoir Mining Co. Ltd.	74,000	11,917	61,788	8,147	190	(c)
East Malartic Mines Ltd.	44,334		44,334	5,568	750	(c)
Francoeur Gold Mines Ltd.	22,299		22,299	3,466	150	(b)
Halliwell Gold Mines Ltd.	2,718	1,000	2,718	1,165	(d)	(d)
Lake Rose (Quebec) Mines Ltd.	4,500	622	3,806	2,199	25	(a) (c)
Lamaque Mining Co. Ltd.	393,715		393,715	129,357	1,000	(c)
Lapa Cadillac Gold Mines Ltd.	21,338		21,338	1,474	250	(a)
McWatters Gold Mines Ltd.	36,145	2,101	37,558	11,282	150	(a) (c) (e)
O'Brien Gold Mines Ltd.	55,795		55,628	40,938	150	(a) (c)
Pan-Canadian Gold Mines Ltd.	8,837	3,000	5,837	1,072	50	(a)
Payore Holdings Ltd.	4,812		4,812	466	35	(a) (f)
Perron Gold Mines Ltd.	186,410	62,163	124,247	35,614	340	(c)
Powell Rouyn Gold Mines Ltd.	(x)	(x)	159,430	25,567		(g)
Shawkey Gold Mines Ltd.	49,574	7,813	41,761	7,702	200	(a) (c)
Sigma Mines (Quebec) Ltd.	201,176		224,861	51,385	300	(c)
Siscoe Gold Mines Ltd.	215,174	28,228	187,767	66,783	600	(a) (c)
Sladen-Malartic Mines Ltd.	103,709		103,709	16,925	250	(c)
Stadacona Rouyn Mines, Ltd.	157,497		157,497	22,589	500	(c)
Sullivan Consolidated Mines Ltd.	65,174		65,174	22,453	300	(a) (c)
Thompson Cadillac Mining Corp.	71,711		78,247	6,556	200	(a) (h)
Other gold Mines.				217		
Copper-gold-silver ores				305,234		
Total—Quebec				881,263		

FOOTNOTES—

- (x) Not recorded.
 (a) Amalgamation.
 (b) In concentrates shipped to smelter.
 (c) Cyanidation.
 (d) Milled by Arntfield Gold Mines Ltd.
 (e) Includes 3,514 tons tailings retreated.
 (f) 80 tons concentrates stored; concentrates also smelted.
 (g) Crude ore shipped to smelter.
 (h) Concentrates shipped to smelter.

ONTARIO						
Porcupine District—						
Buffalo Ankerite Gold Mines Ltd.	378,840	16,002	362,838	84,363	1,000	(c)
Coniaurum Mines Ltd.	188,975		188,975	47,517	600	(c)
Delnite Mines Ltd.	86,346		85,816	18,812	275	(c)
Dome Mines Ltd.	601,700		601,700	206,957	1,500	(a) (c)
Hallnor Mines Ltd.	76,025		60,979	38,960	400	(c)
Hollinger Consolidated Gold Mines Ltd. (Ross)	44,558		44,399	13,170	150	(c)
Hollinger Consolidated Gold Mines Ltd. (Timmins)	1,737,331		1,734,647	439,194	6,000	(c)
Mace Gold Mines Ltd.	61,980		62,070	6,506	300	(c)
McIntyre Porcupine Mines Ltd.	872,740		872,740	234,737	2,500	(c)
Moneta Porcupine Mines Ltd.	53,070		54,577	28,823	200	(c)
Naybob Gold Mines Ltd.	7,832		10,339	1,179	150	(c)
Pamour Porcupine Mines Ltd.	515,843		515,193	94,012	1,500	(c)
Paymaster Consolidated Mines Ltd.	193,117		190,107	39,722	550	(c)
Porcupine Lake Gold Mining Co. Ltd.	4,856	16	4,714	624	20	(a)
Preston East Dome Mines, Ltd.	6,129		(x)	3,933		(b)

Table 26.—Production of Gold in Canada, by Principal Mines, 1938—Continued

Property and Province	Ore raised	Material sorted (discarded)	Ore treated	Gold production	Mill capacity 24 hours	See footnotes
	Tons	Tons	Tons	Fine oz.	Tons	
ONTARIO—Continued						
Kirkland Lake District—						
Bidgood Kirkland Gold Mines, Ltd.....	52,886		52,636	17,412	125	(c)
Golden Gate Mining Co. Ltd.....	11,090		11,090	4,757	150	(a) (c)
Kirkland Lake Gold Mining Co. Ltd.....	92,665		92,665	42,103	225	(c)
Lake Shore Mines Ltd.....	921,837		921,837	429,182	2,300	(c)
Macassa Mines Ltd.....	111,525		110,718	50,213	400	(c)
Mesabi Gold Mines Ltd.....	1,485	84	1,193	130	100	(x)
Morris Kirkland Gold Mines Ltd.....	22,519		22,929	3,187	100	(c)
Sylvanite Gold Mines Ltd.....	185,681		190,714	68,623	525	(c)
Teck-Hughes Gold Mines Ltd.....	380,215		380,215	102,816	1,000	(c)
Toburn Gold Mines Ltd.....	62,952	10,518	52,434	31,553	150	(c)
Upper Canada Mines Ltd.....	6,424		6,270	1,510		(d)
Wright-Hargreaves Mines Ltd.....	434,650		434,650	221,204	1,200	(c)
Larder Lake District—						
Kerr-Addison Gold Mines Ltd.....	148,642		148,642	27,805	650	(c)
Omega Gold Mines Ltd.....	176,852		176,852	24,565	500	(c)
Raven River Mines, Ltd.....	25,101	1,137	23,964	5,688	75	(c)
Matachewan District—						
Hollinger Consolidated Gold Mines, Ltd. (Young-Davidson).....	359,819		359,266	35,389	1,000	(c)
Matachewan Consolidated Mines Ltd.....	154,409		154,409	23,310	300	(c)
Sudbury District—						
Lebel Oro Mines Ltd.....	34,472		34,627	6,421	75	(c)
Consolidated Mining & Smelting Co. of Canada, Ltd. (Golden Rose).....	40,181		40,161	13,959	100	(c)
Tionaga Gold Mines Ltd.....	(x)	150	2,122	629	50	(a)
Algoma District—						
Algold Mines Ltd.....	8,542		8,542	706	100	(a)
Algoma Summit Gold Mines Ltd.....	67,121	451	66,670	5,821	500	(a) (e)
Cline Lake Gold Mines Ltd.....	37,284		32,344	7,274	200	(c)
Deep Lake Gold Mines Ltd.....			(x)	13	25	(f) (a)
Minto Gold Mines Ltd.....	7,851		7,851	2,114	100	(e)
Thunder Bay District—						
Bankfield Cons. Mines Ltd.....	47,632		47,500	18,393	130	(a) (c)
Hard Rock Gold Mines Ltd.....	88,286	12,212	76,074	18,378	300	(c) (g)
Leitch Gold Mines Ltd.....	35,715	5,131	30,584	20,160	75	(a) (c)
Little Long Lac Gold Mines Ltd.....	128,130	30,810	97,320	43,849	280	(a) (c) (h)
McLeod-Cockshutt Gold Mines Ltd.....	139,410	12,419	126,291	25,518	500	(c)
Magnet Cons. Mines Ltd.....	3,446		2,946	1,752		(i)
Northern Empire Mines Co. Ltd.....	59,688		59,332	22,823	180	(c)
St. Anthony Gold Mines Ltd.....	33,383	4,879	28,945	6,226	125	(c)
Sand River Gold Mining Co. Ltd.....	45,230	9,560	35,670	12,898	75	(c)
Sturgeon River Gold Mines Ltd.....	45,697	17,540	28,157	14,432	75	(a) (c)
Theresa Gold Mines Ltd.....	(x)		190	15	12	
Tombill Gold Mines Ltd.....	23,750		26,486	11,001	100	(a) (c)
Kenora and Rainy River Areas—						
Orelia Mines Ltd.....			500	23	25	(a) (f)
Straw Lake Beach Gold Mines Ltd.....	2,395		2,475	526	60	(a)
Wendigo Gold Mines Ltd.....	35,141	5,100	30,041	10,160	80	(a) (e) (k)
Patricia District—						
Argosy Gold Mines Ltd.....	1,700	50	1,636	1,014	125	(a) (c)
Central Patricia Gold Mines Ltd.....	102,852	1,476	101,376	45,596	200	(c)
Gold Eagle Gold Mines Ltd.....	56,394	12,583	43,811	10,270	125	(c)
Hasaga Gold Mines Ltd.....	8,052	287	3,206	699	125	(c)
Howey Gold Mines Ltd.....	538,444	90,329	448,115	34,244	1,250	(c)
J. M. Consolidated Gold Mines Ltd.....	18,280	1,275	17,005	3,983	100	(c)
Madsen Red Lake Gold Mines Ltd.....	44,663		44,663	9,269	360	(a) (c)
McKenzie Red Lake Gold Mines Ltd.....	79,783	16,462	63,321	25,285	150	(c)
Pickle Crow Gold Mines Ltd.....	135,808	20,461	136,376	78,565	400	(a) (c)
Red Lake Gold Shore Mines Ltd.....	34,173	5,779	23,865	4,481	125	(c) (l)
Sachigo River Exploration Co. Ltd.....	8,837	2,660	6,084	10,683	25	(a) (c)
Other gold mines.....						
	(x)	(x)	(x)	1,114		
Nickel-copper ores.....						
				80,227		
Total—Ontario.....				2,896,477		

FOOTNOTES—

- (x) Not recorded.
 (a) Amalgamation.
 (b) High grade and ore shipped for smelting.
 (c) Cyanidation.
 (d) Milled by Morris Kirkland Gold Mines.
 (e) Also in ore or concentrates shipped for smelting.
 (f) Clean-up operations.
 (g) 397 tons concentrates stored.
 (h) 3,100 tons tailings also retreated.
 (i) Milled and cyanided at other mines.
 (j) Tailings only treated.
 (k) 22 tons copper-gold concentrates stored.
 (l) Property taken over by Hasaga Gold Mines.

Table 26.—Production of Gold in Canada, by Principal Mines, 1938—Continued

Property and Province	Ore raised	Material sorted (discarded)	Ore treated	Gold production	Mill capacity 24 hours	See footnotes
	Tons	Tons	Tons	Fine oz.	Tons	
MANITOBA						
God's Lake Gold Mines Ltd.....	70,727		70,727	22,183	200	(a) (c)
Gunnar Gold Mines Ltd.....	54,815	8,335	51,480	17,565	150	(c)
Gurney Gold Mines Ltd.....	63,193	15,463	47,735	13,867	125	(c)
Laguna Gold Mines Ltd.....	41,136	8,829	32,307	16,390	50	(a) (c)
San Antonio Gold Mines Ltd.....	117,403		117,373	31,244	300	(a) (c)
Shannon, V. D. (Oro Grande).....	5,345		5,345	2,006	50	(a) (b)
Other gold mines.....				64		
Copper-gold-silver ores.....				82,387		
Total—Manitoba.....				185,706		

FOOTNOTES—

(a) Amalgamation.

(b) In addition, 450 tons tailings were retreated and 110 tons of concentrates stored.

(c) Cyanidation.

SASKATCHEWAN						
Consolidated Mining & Smelting Co. of Canada, Limited (Box).....	17,640				1,000	(a)
Alluvial deposits.....	(x)	(x)	(x)	81		
Gold mines.....				12		(b)
Copper-gold-silver ores.....				49,928		
Total—Saskatchewan.....				50,021		

FOOTNOTES—

(a) Development and construction only.

(b) In small shipments of ore to smelter.

(x) No record.

ALBERTA						
Placer gold.....	(x)	(x)	(x)	305		

(x) No record.

BRITISH COLUMBIA						
Ashloo Gold Mines Ltd.....	5,012		5,012	2,318	25	(b)
Bayonne Consolidated Mines Ltd.....	19,298		19,298	10,288	50	(a) (c)
B. R. X. Cons. Mines Ltd.....	4,787		4,787	15	110	(c)
Bralorne Mines Ltd.....	180,526		180,526	103,867	475	(a) (b)
Buena Vista Mining Co. Ltd. (Big Missouri).....	154,387		154,387	12,540	500	(c)
Cariboo Gold Quartz Mining Co. Ltd.....	102,541		102,539	42,906	300	(c)
Cariboo-Hudson Gold Mines Ltd.....	(x)		2,438	732	100	(c)
Central Zeballos Gold Mines Ltd.....	(x)		31	152		(b)
Clubine Comstock Gold Mines Ltd.....	(x)	(x)	851	649		(b)
Danzig Mines Inc.....	(x)	(x)	43	42		(b)
Dentonia Mine.....	(x)	(x)	1,873	557		(b)
Dufferin Golds Ltd.....	85		85	55		(b)
Endersly, A. (Motherlode and Nugget).....	350		350	232		(b)
Fairview Amalgamated Gold Mines Ltd.....	46,810	750	46,060	3,921	150	(b)
Gold Belt Mining Co. Ltd.....	9,844		9,844	4,437	150	(c)
Greenbridge Gold Mines Ltd.....	(x)	(x)	220	22		(b)
Hedley Mascot Gold Mines Ltd.....	(x)		63,868	23,003	175	(b) (d)
Inland Empire Mine Syndicate.....	598		598	131		(b)
Island Mountain Mines Co. Ltd.....	44,916		44,916	18,467	110	(c)
I.X.L. Leasors Ltd.....	150		150	393		(b)
Kalamalka Gold Mines Ltd.....	938		938	267		(b)
Kelowna Exploration Co. Ltd.....	88,697		88,636	30,591	250	(c) (b)
Kootenay Belle Gold Mines Ltd.....	48,238		48,238	19,421	100	(c)
Livingstone Mining Co. Ltd.....	1,351	2,702	1,511	448	30	(a) (b)
McArthur, W. E. (Brooklyn).....	12,887		12,887	2,611	50	(b)
McArthur, W. E. (No. 7 Boundary Falls).....	2,453		2,453	288		(b)
McArthur, W. E. (Athelstan).....	353		353	172		(b)
Midnight Mining Co.....	1,324	1,059	265	991		(b)
Molly Gibson Mines Ltd.....	50		22	32		(b)
Oscarson, Roger (Arlington).....	978		972	1,845		(b)
Osoyoos Mines of Canada, Ltd.....	20,639		20,639	4,297	75	(c) (b) (f)
Pioneer Gold Mines of B.C. Ltd.....	142,775	19,871	123,304	58,271	300	(a) (c)
Polaris-Taku Mining Co. Ltd.....	52,679		58,759	12,765	150	(b) (e)
Privateer Mine Ltd.....	45,389		9,214	16,023	75	(c) (b) (e)
Relief of Arlington Mines Ltd.....	45,918	15,951	29,367	12,344	75	(c)
Reno Gold Mines Ltd.....	48,858		49,158	19,897	120	(a) (c)

Table 26.—Production of Gold in Canada, by Principal Mines, 1938—Concluded

Property and Province	Ore raised	Material sorted (discarded)	Ore treated	Gold production	Mill capacity 24 hours	See footnotes
	Tons	Tons	Tons	Fine oz.	Tons	
BRITISH COLUMBIA—Continued						
Reward Mining Co. Ltd.	11,520	8,009	3,511	1,867	20	(b)
Rey Oro Gold Mining Co. Ltd.	(x)	2,250	446	1,102	10	(a) (b)
Riegel Mines Ltd. (Providence)	143		143	89		(b)
Riegel Mines Ltd. (Yankee Boy)	404		404	239		(b)
Sheep Creek Gold Mines Ltd.	53,728		53,728	25,897	150	(c)
Silbak Premier Mines Ltd.	184,606		184,606	45,073	500	(b)
Spud Valley Gold Mines Ltd.	(x)	215	1,702	152	50	(a) (b)
Surf Inlet Cons. Gold Mines Ltd.	20,281	2,853	17,428	6,842	50	(b)
Vidette Gold Mines Ltd.	6,683		6,732	3,288	60	(b)
Wesko Mines Ltd.	15,096		15,096	2,930	100	(c)
Wilcox Mining Syndicate	1,395		1,395	349	20	(a) (b)
Windpass Gold Mining Co., Ltd.	18,055	7,284	19,059	5,790	60	(b)
Ymir Consolidated Gold Mines Ltd.	(x)	2,416	13,978	5,481	100	(b) (e)
Ymir Yankee Girl Mines Ltd.	42,565		42,717	12,025	100	(c) (b)
Placer gold			(l) 4,063,746	46,207		
Copper-gold and silver-lead ores and other gold mines				43,796		
Total—British Columbia				605,617		

FOOTNOTES—

(x) Not recorded.

(a) Amalgamation.

(b) Ore or concentrates shipped for smelting.

(c) Cyanidation.

(d) Not including gold content of 69 tons of concentrate.

(e) Concentrates were also stock piled.

(f) 41,209 tons tailings also retreated.

(l) Partly estimated.

YUKON						
Placers			(l) 8,870,628	71,303		
La Forma (quartz)	(x)	(x)	(x)	(216)	10	
Silver-lead ores				1,065		
Total—Yukon				72,368		

FOOTNOTES—

(x) No record; production conjectural.

(l) Cubic yards, partly estimated.

NORTHWEST TERRITORIES						
Consolidated Mining and Smelting Co. of Canada, Limited (Con Mine)	14,052		13,832	6,794	100	(a) (c)
Silver ores				6		(b)
Total—Northwest Territories				6,800		

FOOTNOTES—

(a) Amalgamation.

(b) In ores smelted.

(c) Cyanidation.

Grand Total—Canada				4,725,117		
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Table 27.—Production of Gold in Canada, 1929-1938

Year	Fine ounces	Value*	Year	Fine ounces	Value*	Value in Canadian funds
		\$			\$	\$
			1931	2,693,892	55,687,688	58,093,396
			1932	3,044,387	62,933,063	71,479,373
			1933	2,949,309	60,967,626	84,350,237
1929	1,928,308	39,861,663	1934	2,972,074	61,438,220	102,536,553
1930	2,102,068	43,453,601	1935	3,284,890	67,904,700	115,595,279
			1936	3,748,028	77,478,612	131,293,421
			1937	4,096,213	84,676,235	143,326,493
			1938	4,725,117	97,676,834	166,205,990

NOTE.—For years 1858 to 1928, see previous reports.

* Calculated from the value \$1=0.048375 ounces.

Table 28.—World Production of Gold Ore, 1936-1938

(In terms of metal) (Fine troy ounces) Supplied by Imperial Institute

Producing Country	1937	1938	Producing Country.	1937	1938
BRITISH EMPIRE—			FOREIGN COUNTRIES. (Cont.)		
United Kingdom.....	60	2,428	Sweden.....	193,222	234,116
Anglo-Egyptian Sudan.....	7,388	8,866	U.S.S.R. (d).....	5,000,000	5,000,000
Bechuanaland Protectorate.....	17,577	18,653	Yugoslavia.....	87,560	78,000
Gold Coast.....	559,212	674,927	Abysinia.....	(a)	(a)
Kenya.....	54,774	70,500	Belgian Congo.....	419,654	450,000
Nigeria.....	26,466	24,815	Cameroon (French).....	14,224	15,541
Northern Rhodesia.....	4,228	1,113	Egypt.....	1,226	2,162
Southern Rhodesia.....	804,219	814,078	Eritrea.....	(a)	(a)
Sierra Leone.....	35,717	30,012	French Equatorial Africa.....	21,489	35,518
South West Africa.....	2,804	1,796	French West Africa (exports).....	119,000	118,000
Swaziland.....	2,410	1,246	Liberia (exports).....	2,457	1,902
Tanganyika Territory.....	75,281	81,857	Madagascar.....	13,500	13,760
Uganda (exports).....	16,947	20,502	Morocco (French).....	4,630	1,410
Union of South Africa.....	11,734,575	12,161,392	Mozambique.....	(a)	(a)
Canada.....	4,096,213	4,725,117	Costa Rica.....	16,920	17,994
Newfoundland.....	22,470	24,246	Dominican Republic.....	6,397	5,898
British Guiana.....	35,993	38,482	Guatemala.....	4,190	5,489
Burma.....	1,004	1,209	Honduras.....	33,526	30,281
Cyprus (c).....	23,650	19,894	Nicaragua.....	24,242	44,506
Federated Malay States.....	33,828	40,209	Panama.....	(a)	(a)
Unfederated Malay States.....	519	581	Porto Rico.....	17	9
India.....	330,744	321,138	Salvador.....	8,564	6,506
Sarawak.....	19,214	18,520	Mexico.....	846,381	923,798
Straits Settlements.....		5	United States.....	4,117,078	4,267,469
Australia.....	1,381,135	1,592,035	Argentina.....	10,500	(a)
Fiji.....	24,917	92,362	Bolivia (exports).....	4,267	9,922
New Guinea.....	217,152	236,126	Brazil.....	145,800	142,907
New Zealand.....	168,487	152,050	Chile.....	315,553	278,532
Papua.....	22,153	27,000	Colombia.....	442,222	520,717
Total.....	19,720,000	21,200,000	Dutch Guiana (crude).....	12,756	14,153
			Ecuador.....	70,906	70,544
			French Guiana (exports).....	45,557	40,637
			Peru.....	205,350	(c)254,465
			Venezuela.....	116,517	114,984
			Formosa (estimated).....	112,000	(a)
			French Indo-China.....	10,127	(a)
			Japan.....	723,400	(b)740,000
			Korea (estimated).....	850,000	1,050,000
			Netherlands East Indies.....	55,616	76,300
			Philippine Islands.....	716,967	903,265
			Siam.....	12,718	13,736
			Total.....	15,300,000	16,100,000
			*World's Total.....	35,000,000	37,300,000

*Gold is also produced in China and Manchuria—an allowance for this production is made in the total.

(a) Information not available.

(b) Estimated.

(c) Exports.

(d) Approximate figures only. It is not possible to form any reliable estimate from the data given in Russian publications.

Table 29.—Source of Canadian Fine Gold Production, by Percentages, 1936-1938

	1936	1937	1938
	%	%	%
In alluvial gold.....	2.27	2.20	2.50
In crude gold bullion*.....	77.37	80.20	80.80
In base bullion (from silver-lead ores, etc.).....	1.60	0.90	0.92
In blister copper.....	13.80	11.70	11.24
In ores, matte, slags, etc., exported.....	4.96	5.00	4.54
	100.00	100.00	100.00

* Includes a relatively small quantity of gold contained in interprovincial shipments of gold ores to smelters.

Gold Exports—(Order in Council P.C. 3189, December 20, 1938)

WHEREAS by Order in Council, P.C. 1150, dated May 17, 1932, regulations respecting the export of gold, whether in the form of coin or bullion, from the Dominion of Canada, were made under the authority of The Gold Export Act;

AND WHEREAS the said regulations were by Order in Council, P.C. 3124, dated December 18, 1937, continued in force until December 31, 1938;

AND WHEREAS in the opinion of the Minister of Finance it is expedient that the said regulations be continued in force beyond December 31, 1938;

NOW, THEREFORE, His Excellency the Governor General in Council, on the recommendation of the Minister of Finance and under the provisions of the said The Gold Export Act, is pleased to order that the provisions of the said regulations be and they are hereby continued in force and effect until December 31, 1939, unless sooner rescinded by Order in Council.

NOTE.—Order in Council, P.C. 1150, reads, in part, as follows—"The export of gold, whether in the form of coin or bullion (including ore, etc.), from the Dominion of Canada, is hereby prohibited, except in such cases as may be deemed advisable by the Minister of Finance, and under license to be issued by him...."

Table 30.—Imports Into Canada and Exports of Gold, Calendar Year 1938

(External Trade Branch)

	\$
IMPORTS—	
Coin and bullion—	
Gold coins.....	389,650
Coins, n.o.p.....	1,530,345
Gold in bars, blocks, ingots, drops, sheets or plates, unmanufactured.....	57,391,376
Gold, other—	
Bullion, fringe or gold fringe.....	3,582
Manufactures of gold and silver—	
Leaf.....	61,269
Sweepings.....	104
Manufactures, n.o.p.....	28,606
Electroplated ware.....	1,141,374
Gold, unmanufactured, for commercial purposes.....	71,402
EXPORTS—	
Gold-bearing quartz, dust, nuggets and crude bullion obtained direct from mining operations.....	8,192,591
Jewellers' sweepings (gold, silver and platinum).....	1,211,204
Coin and bullion—	
Gold bullion other than monetary.....	67,659,295
Canadian gold bullion—monetary.....	—
Canadian gold coin—monetary.....	—
Foreign gold bullion—monetary.....	—
Foreign gold coin—monetary.....	28,412,977
Foreign gold coin—other than monetary.....	32,190,036

Exports of gold in Canadian trade statistics are distinguished as between monetary and non-monetary. Monetary gold exports are those which entail a reduction in the Dominion's monetary gold stocks. All other gold exports (classed as non-monetary) are shown as merchandise and included with total merchandise exports.

Gold does not move in international trade in any direct or normal relation to sales and purchases. It may be bought or sold abroad without moving in or out across the frontier. Trade statistics deal only with physical movements, sales or purchases of gold which do not involve an actual movement being more properly regarded as an "invisible item" and taken care of in the "International Balance of Payments" statements. Changes in the Bank of Canada's stock of gold under earmark do not enter, therefore, into the trade statistics. Additions to the stock from imports are taken account of when the gold in question enters Canada, not when it is added to earmark. Similarly, domestic gold added to earmark stock, although sold abroad, does not appear in export statistics because it remains in Canada.

Table 31.—Imports of Gold Into the United States, 1934-1939

(United States Department of Commerce)

Year and Month	Ore and base bullion		Bullion, refined		United States coin	Foreign coin	Total
	Ounces	\$	Ounces	\$	\$	\$	\$
1939—May.....	193,050	6,724,491	12,082,665	422,616,789	.....	99,877	429,440,157
April.....	194,616	6,753,082	17,122,334	599,267,471	27	6,847	606,027,427
March.....	237,730	8,194,743	10,191,281	356,393,906	119	847,669	365,436,437
February.....	162,921	5,660,864	6,169,983	215,807,907	.....	1,827,612	223,296,383
January.....	214,062	7,455,011	4,268,221	148,970,130	400	1,180	156,426,721

(thousands omitted)

1938.....	2,240	77,628	53,920	1,885,628	.....	16,201	1,979,458
1937.....	2,150	74,215	44,469	1,554,667	2	2,640	1,631,523
1936.....	2,133	73,705	30,519	1,067,680	2	2,730	1,144,117
1935.....	2,103	72,718	45,103	1,578,635	5,375	84,250	1,740,979
1934.....	1,119	36,274	32,678	1,140,764	7,179	2,454	1,186,671

Table 32.—Estimated Average Monthly Value of an Ounce of Fine Gold, Expressed in Canadian Funds, 1936-1938

Month	1936	1937	1938
	\$	\$	\$
January.....	35-06	35-01	34-99
February.....	35-18	35-01	35-00
March.....	35-11	34-98	35-05
April.....	35-15	34-95	35-15
May.....	35-00	34-94	35-22
June.....	35-09	35-02	35-36
July.....	34-91	35-05	35-24
August.....	35-00	35-00	35-12
September.....	34-99	35-00	35-12
October.....	34-99	34-99	35-32
November.....	34-95	34-98	35-25
December.....	34-98	34-93	35-28
Yearly Average.....	35-03	34-99	35-17

NOTE.—Procedure regarding the marketing of gold by the Department of Finance, Ottawa, is shown elsewhere in this report. At December 29th, 1938, the price paid by the United States Treasury for gold purchased by the Mint continued at \$35 per troy ounce of fine gold, less $\frac{1}{4}$ of 1 per cent. Actual payment by the United States Treasury for gold imported and domestic ore or concentrate was at 99.75 per cent of the price quoted by the Treasury, which, at the close of 1938, was equal to \$34.9125 per ounce.

Data for previous years contained in the 1937 Annual Report of Mineral Production.

Table 33.—Precious Metals Consumed by the Jewellery and Silverware Industry in Canada, 1937 and 1938

	Cost at Works	
	1937	1938
	\$	\$
Fine gold.....	955,362	930,836
Gold alloys.....	78,773	494,965
Fine silver.....	480,215	505,038
Silver alloys.....	414,474	361,555
Platinum.....	112,295	85,503
Old gold for refining.....	1,489,474	1,426,243
Jewellers' findings, waste and scrap for refining.....	388,146	283,703
Gold-filled wire and stock.....	137,964	94,301

Table 34.—Canadian Gold Stocks, 1925-1938

(Thousands of fine ounces)

December 31	Dominion Notes on Statutory Reserve	Chartered Bank Gold in Canada*	Postal Savings Bank Reserve	Free Gold balance of Minister of Finance	Total Gold Stock
1925	6,506	3,014	154	9	9,683
1926	6,187	3,115	150	9	9,461
1927	6,039	3,067	147	138	9,391
1928	4,152	2,961	141	221	7,475
1929	2,841	2,675	124	82	5,722
1930	4,398	2,612	117	140	7,267
1931	2,994	2,467	113	133	5,707
1932	3,395	2,056	109	29	5,589
1933	3,326	1,814	111	44	5,295
1934	3,163	1,822	107	285	5,397
	Bank of Canada Gold Reserve				
1935	5,158	1	105	136	5,400
1936	5,159	2	104	119	5,384
1937	5,160	2	106	55	5,323
1938	5,283	2	109	93	5,487

* Including gold coin deposited in the Central Gold Reserves.

NOTE.—The amounts of gold held by chartered banks in Canada in 1925-1934 exclude an estimated figure of subsidiary coin holdings in 1925-1928 and an actual figure reported by the banks for 1929-1934. (Supplied by Bank of Canada.)

Table 35.—World's Monetary Stocks of Gold at the Close of 1938 (Subject to revision)

(Compiled by the United States Mint from available data)

(Stated in United States money)

Country	Total Gold Stock Value, 1938 (f)	Per capita
	\$	\$
United States (e).....	14,511,624,000	111.04
Canada.....	193,088,000	17.23
Argentina.....	431,561,000	33.30
Belgium.....	728,104,000	86.82
Denmark.....	53,366,000	14.07
France.....	2,430,376,000	57.89
Germany.....	28,543,000	0.36
Great Britain.....	2,696,043,000	56.78
Italy.....	192,885,000	4.43
Netherlands.....	994,525,000	113.96
Norway.....	93,598,000	32.04
Poland.....	84,541,000	2.41
Portugal.....	68,758,000	9.22
Roumania.....	132,791,000	6.69
Russia (Soviet Union).....	(b)	(b)
Spain.....	525,000,000	21.00
Sweden.....	321,119,000	50.89
Switzerland.....	699,095,000	166.06
British India.....	274,578,000	0.76
Japan (including Chosen, Taiwan, Kwantung).....	163,476,000	1.59
Netherlands East Indies.....	79,552,000	1.18
Egypt.....	52,229,000	3.26
Australia (a).....	3,435,000	0.50
New Zealand.....	23,086,000	14.39
Union of South Africa.....	229,357,000	23.19
Other countries.....	746,510,000	—
Total.....	25,757,240,000	(c) 12.46

(a) On June 30, 1938.

(b) Russian data omitted because of indefiniteness or unavailability.

(c) Population figures are principally from Yearbook of the League of Nations, 1936-37-38.

(d) Includes Alaska, Hawaii and Puerto Rico.

(e) 1 ounce fine gold = \$35.

NOTE.—It is understood that material amounts of gold are not reported by several countries, such as amounts held in secret funds for stabilizing currencies and those hoarded or held outside of regularly reported stocks.

THE ALLUVIAL GOLD MINING INDUSTRY IN CANADA

At the present time the greater part of the Canadian production of alluvial gold comes from Yukon Territory and British Columbia; relatively small quantities are also obtained in Alberta, Saskatchewan and Quebec.

It was estimated that 147,405 ounces of crude gold were recovered from Canadian alluvial deposits in 1938. Of this production, 110 ounces came from Saskatchewan, 407 ounces from Alberta, 57,759 ounces from British Columbia, and 89,129 ounces from Yukon.

Quebec.—In Quebec a little prospecting for alluvial gold was carried out in Beauce county on the Famine river, and also in Compton county on the Salmon river. A very small production was reported but no sales or shipments of crude gold were recorded. On the southeast slope of Stoke Mountains the East Angus Placer Mining Society moved over 8,500 cubic feet of material in trenching and sluicing and constructed a dirt dam on Willard Brook. On the Famine river, 520 feet of flume and dam were completed by Beauce Gold Mines Ltd.

No particulars relating to the exact source of placer gold recovered in Saskatchewan and Alberta during 1938 are available and statistical data pertaining to actual production have been compiled from receipt statements supplied by the Royal Canadian Mint, Ottawa, and the Dominion Assay Office, Vancouver, B.C. The placer gold recovered in Saskatchewan came from the North Saskatchewan river in the western central part of the province.

British Columbia.—It has been found impractical to obtain complete reports for each individual placer gold mining operation in British Columbia in as much as a considerable quantity of the crude placer gold is recovered annually by prospectors of no fixed abode, who, in many instances, market their recoveries through local merchants and banks. In 1938 official returns were made by 103 operators who reported 588 employees and the distribution of \$857,229 in salaries and wages. Consumption of fuel and process supplies amounted to \$118,336 and the value of crude gold sold was estimated at \$1,661,149.

While a decrease in the production of placer gold in British Columbia during 1938 had been anticipated, principally through the flooding of one section of Consolidated gold alluvials at Wingdam, this was more than compensated for by increased production in the Atlin section and Omineca district, and also from numerous small operations in other districts. Considerably more interest is being taken in placer mining in the province through the activities of outside interests, many of whom have previously been operating in California.

Yukon.—The following information is from the annual report of the Controller of the Yukon Territory for the fiscal year ending March 31, 1939:—

“The amount of placer gold mined during the year on which royalty export tax was paid was 90,594.55 ounces, produced as follows: Dawson district, 89,130.31 ounces; Mayo district, 733.35 ounces; Whitehorse district, 730.89 ounces. The royalty collected was \$33,973.46. The gold production was 32,054.09 ounces more than for the previous year.

“The Yukon Consolidated Gold Corp. Ltd. conducted hydraulic stripping operations for the entire season at all plants which were operated during the preceding year except in the Arlington area; a total of \$201,600.00 was expended on stripping operations during the year. Cold water thawing operations were continued at all plants formerly operated and new plants installed and operated on Upper Sulphur and Quartz Creeks. A total of \$275,000.00 was expended on thawing operations during the year. Dredging operations were conducted in 1938 at Upper Dominion, Klondike River, Lower Bonanza, Arlington, Granville Flats, Lower Sulphur, Quartz, Middle Sulphur and Upper Sulphur; 8,550,652 cubic yards of ground was dredged and 60,055,768

fine ounces of gold and 14,411.98 fine ounces of silver recovered. Construction of Dredge No. 8, an all new 7 cubic feet Yuba designed dredge was completed and placed in operation on Middle Sulphur Creek on May 28. During the summer Dredge No. 9 was constructed on Upper Sulphur Creek; after completing Dredge No. 9 work was immediately started on construction of Dredge No. 10 for Middle Dominion Creek. During 1939 No. 11 dredge will be constructed on Middle Hunker Creek. The 16 cubic foot dredges Nos. 2 and 4 which were operating in the Klondike valley were shut down on December 24 and 25, respectively, which are the latest dates that two dredges have ever been able to operate in the district. Expenditures for equipment and supplies not purchased locally totalled \$521,425.00."

The dredge operated by the Holbrook Dredging Company on the Upper Sixtymile river commenced operations on May 26 and was closed down on November 19; during this period 5,027.29 crude ounces of gold were recovered.

"Individual mining operations, chiefly during the summer season were confined to old placer creeks such as Bonanza, Eldorado, Quartz, Hunker, Gold Bottom, Dominion, Gold Run and Sulphur Creeks in the Dawson area; Miller and Glacier creeks in the Sixtymile area; Haggart and Highest creeks in the Mayo district; Livingston creek and tributaries, and on scattered creeks in the region west of Whitehorse. Prospecting for placer has been on the increase throughout the whole Territory."

Northwest Territories.—Very little activity in placer mining developed in the Northwest Territories during 1938. In the Nahanni river district there were 15 renewals and 10 new placer grants issued.

Table 36.—Summary Statistics of Alluvial Gold Mining in Canada, 1937 and 1938

	1937			1938		
	(d) British Columbia	Yukon (e)	(f) Quebec and Alberta	(d) British Columbia	(e) Yukon	(f) Quebec, Saskatchewan and Alberta
Number of firms and individual operators†	100	3	3	103	4	5
Capital employed..... \$	4,552,173	7,363,027	4,737	5,045,001	7,781,435	20,537
Number of employees.....	618	420	31	588	471	12
Salaries and wages paid..... \$	861,644	811,310	16,957	857,229	1,194,046	5,661
Electricity generated for own use..... K.W.H.	2,070,630	21,190,912	.....	1,579,119	29,949,900	.....
Electricity generated for sale..... K.W.H.	16,795	3,858,618	.....	59,221	3,506,028	.....
Crude gold recovered..... crude ounces	54,153	58,349	72	57,759	89,129	517
Platinum recovered..... ounces	22	.....	.....	23	.....	.....
Value of platinum recovered..... \$	1,066	.....	.....	812	.....	.....
Quantity of material handled..... cu. yards	3,472,025	8,298,514	(c)	4,138,746	8,870,628	(c)
Length of ditches (b)..... miles	147	71	.....	139	48	.....
Total gross value of alluvial products..... \$	1,560,672	1,680,451	2,073	1,661,961	2,364,592	14,869
Fuel and electricity used (purchased).... \$	61,926	36,279	867	57,414	77,252	407
Process supplies used..... \$	75,635	781	1,072	60,922	52,037	590
Cost of freight and express on dust, nuggets, bullion, etc., shipped..... \$	(c)	(c)	(c)	3,549	8,537	.....
Cost of smelter, refinery and mint treatment on raw material shipped..... \$	(c)	(c)	(c)	10,589	17,073	.....
Total net value of alluvial products..... \$	1,423,111	1,643,391	134	1,529,487	2,209,693	13,872

(†) In addition to the number shown in the table, there were numerous small operators from whom returns were not obtainable; subject to revision.

(a) Recoveries for Alberta and Saskatchewan represent receipts of crude gold from Alberta and Saskatchewan at the Royal Canadian Mint, Ottawa, and the Dominion Assay Office, Vancouver, B.C. No other statistics available.

(b) Includes flumes; in use.

(c) Information not available.

(d) Value of crude gold in Canadian funds in 1937 was estimated to be \$28.50 per crude ounce. In 1938 it was \$28.76.

(e) Value of crude gold in Canadian funds in 1937 was estimated to be \$26.15 per crude ounce. In 1938 it was \$26.53.

(f) Value of crude gold in Canadian funds in 1937 was estimated to be \$28.80 per crude ounce. In 1938 it was \$28.76.

THE AURIFEROUS QUARTZ MINING INDUSTRY IN CANADA

The great part of the gold of Canada comes from the Canadian Shield, an immense area of precambrian rocks extending from the Labrador Coast westward almost to the mouth of the MacKenzie river. The area of the shield is roughly 1,825,000 square miles, almost half of Canada. The deposits of the shield are of two main types, namely, quartz veins, from which most of the gold, up to the present time, has been won, and sulphide deposits which produce a smaller but very considerable proportion. The second great source of gold in Canada has been the Western or Cordilleran section, comprising British Columbia and Yukon Territories; the gold production from this section includes relatively large quantities obtained from alluvial deposits. The third principal area in which gold deposits occur is the Acadian region of Eastern Canada, the metal occurring principally in Nova Scotia where it has been mined since 1862.

The number of Canadian gold mining firms reporting mining operations in 1938 totalled 535 compared with 631 in 1937; 80 in 1929 and 65 in 1923. During the year under review there were 550 properties in operation compared with 659 in 1937; in 1938, 226 mines reported production as against 189 in 1937 and 33 in 1923.

The gross value of output for the entire industry and including the value of all recoverable metals, including gold, silver, etc., totalled \$143,146,911 in 1938 compared with \$122,676,105 in 1937. Of the 1938 total, \$99,364,867 were contributed by mines in Ontario, \$20,315,407 by mines in Quebec, and \$18,635,187 by the gold mines of British Columbia.

Employees in the lode gold mining industry totalled 29,647 compared with 29,140 in 1937 and 5,524 in 1923. Salaries and wages paid increased from a total of \$48,219,318 in 1937 to \$50,462,092 in 1938 and fuel and purchased electricity consumed by the industry during 1938 amounted to \$7,494,573 while the cost of explosives, drill steel and other process supplies used in the same period amounted to \$18,314,500.

Canadian gold mining companies paid over 40 millions of dollars in 1937 for consumable stores, equipment, electric power, fuel, freight, and insurance, according to a special survey recently completed by the Mining, Metallurgical and Chemical Branch of the Dominion Bureau of Statistics at Ottawa. This is an increase of 40 per cent when compared with the figure for 1935, the last year in which a similar survey was made. Corresponding data for 1938 are not available. Included in the total for 1937 are \$4,705,128 for explosives, \$1,129,665 for rock drills and parts, \$935,807 for drill steel, \$2,848,090 for lumber and timber, \$1,595,835 for electrical equipment, \$6,389,724 for various types of machinery, \$1,458,666 for cyanide plant chemicals, and \$2,155,769 for incoming freight.

Dividends paid during 1938, as computed from actual returns made by the lode gold mining industry, totalled \$38,677,287.

Nova Scotia Gold Mining Industry, 1938

(J. P. Messervey, Inspector of Metal Mines and Quarries, N.S. Department of Mines)

The gold mining of the province which had its inception in 1862 became a major factor in its mineral industry. It reached its peak of production in the year 1898 when the output was over 31,000 ounces. Following this a general decline set in, due to high power costs and poor management. The industry then fluctuated on a low level until 1932 when a definite revival was noticed. This was no doubt due to the increased price of gold, the influx of outside capital, the improved machinery and methods of mining, the policy of the government in its efforts to aid the industry and the recent power developments in the province. From 1932 to 1938 the gold output increased from 941 ounces to 28,545 ounces. The value of the production in 1938 exceeded that of its peak year in 1898 by over \$400,000 and at the rate of production during the first four months of this year the output for 1939 will show a considerable increase over that of 1938 and exceed the highest peak in its history. The value of the production in 1938 was approximately \$1,000,000.

There are today seventeen gold mining enterprises in Nova Scotia of which ten are contributing to the production of gold. Several other properties are under investigation and two retreatment plants are operating upon old tailings beds.

Development of the larger operations is progressing very rapidly and the Seal Harbor mine at Goldboro is now milling an average of 260 tons per day and they plan to increase their milling capacity to 350 tons per day sometime this year. Their total cost per ton of ore milled is among the lowest of the Canadian gold mining operations.

The Government of Nova Scotia, in co-operating with the Youth Employment Commission of the Department of Labour, Ottawa, was the first to establish an apprenticeship system to train unemployed youth in the various branches of hard rock mining. At the present time about one hundred men are employed at the Lacey Mine, Chester Basin. The young men included in the project are selected initially from those who are unemployed and residing in the colliery towns. The apprentices receive free board, free instruction and equipment and are paid at a rate beginning with fifty cents per day. The age limit is from nineteen to twenty-five years. These men are being given an intensive training for one year designed to qualify them to take a semi-skilled position in hard rock mines.

The Lacey Mine which was taken over for the Project is equipped with a mill and the necessary mine equipment for regular operation. This mine has been operating under a program of development work which includes shaft sinking, drifting, stoping, milling and all the associated work connected with regular gold mining.

An Act to amend Chapter 22 of the Revised Statutes, 1923, "The Mines Act", Nova Scotia, provides that there shall be no royalty payable on gold or silver mined in Nova Scotia under licence or lease, between the 31st day of March, 1939, and the 31st day of March, 1940.

Gold Mining Industry of Quebec in 1938

(A. O. Dufresne, Director, Bureau of Mines, Quebec)

The weight of the gold shipped from the mines of the Province of Quebec in 1938 reached a new high record of 875,285 ounces valued at \$30,788,150. These figures bring up the province to the second place among the provinces of the Dominion as a producer of gold; it now ranks immediately after Ontario. It may be recalled that in 1925, the year before the O'Brien mine in Cadillac township made the first shipment of gold from Western Quebec deposits (some 58 oz. valued at \$1,170.45), the Province of Quebec ranked sixth as a gold producer. Practically the whole of Quebec gold is extracted from mines in the Rouyn-Harricana field, which up to twelve years ago had not contributed any to our production. Since 1926 each year has seen a new record established in our annual production of gold. The development of this mining field may be followed year by year in the annual reports of the Quebec Bureau of Mines, of the Federal Department of Mines and of the Dominion Bureau of Statistics.

Returns of production of gold in 1938 were received from thirty operating companies; of these eight mines poured their first gold brick during the year; these new producers were: East Malartic, Francoeur, Halliwell, Lapa Cadillac, Lake Rose, Pan-Canadian, Payore, Sladen-Malartic; all but one of these mines are situated in the Rouyn-Harricana area of Western Quebec.

The Western Quebec mines which produce gold and silver exclusively, mostly from gold-quartz ores, were very active in 1938. These deposits are mainly of the fissure vein type, quartz being the predominant gangue material. At the Francoeur mine a 150-ton mill was erected and production started in the summer. The Arntfield mine and mill were operated continuously. A small body of high-grade ore was mined at the Halliwell after which operations were suspended. The Powell Rouyn Gold Mines' production was increased to 700 tons a day; this is shipped by truck to the Noranda smelter. At the Stadacona Rouyn the grade of the mill-heads was improved and the tonnage increased. At the Beattie mine the roasting plant gave complete satisfaction and the mill, rated at 1,500 tons a day, steadily treated 1,700 tons and frequently exceeded this figure. Production was increased at the O'Brien; the main shaft deepened to 2,000 feet and lateral work started on four new levels. The Thompson-Cadillac mine produced steadily. At the Lapa-Cadillac mine a 200-ton mill was constructed and put into operation. Construction of a 100-ton mill at the Amm mine was begun late in the year. At the Sladen-

Malartic mine a 250-ton mill was started in January, it has treated 300 tons, and later in the year preparations to double the capacity were under way. The East Malartic mill of 1,000-ton capacity started to produce in November. Canadian-Malartic continued to operate on a basis of 700 tons a day and plans were made to sink a new shaft in the east section of the property.

In the Bourlamaque-Dubuisson area, the Sigma mill, originally designed for 300 tons a day, gradually worked up to 500 tons a day in 1937 and to over 600 tons in 1938 without important addition of machinery. The Lamaque mill, rated at 1,000 tons, treated an average in excess of 1,100 tons a day in October. At the Sullivan mine a new crushing plant has been set up, raising the capacity of treatment to 300 tons a day; the No. 1 shaft has been deepened to 1,200 feet, and a large headframe and skips have been installed. At the Payore mine a 50-ton mill was erected and put into operation. Siscoe maintained a steady production. The Gale mine was acquired by the Provincial government and converted into a miners' training school. At the Perron mine, the sinking of a new main shaft was carried out; the mine production increased as compared with previous years. The Courmor maintained a steady output.

In Guillet township a new shaft was sunk at the Belleterre mine. This mine acquired a waterpower site on the Winneway river, 13 miles distant, developed it and the mine is now supplied with an additional 1,500 h.p. from its hydro-electric power plant. In the spring of 1938, buildings to house a 25-ton milling plant were erected at the Lake Rose mine, 75 miles north of Senneterre; the equipment was transported by aeroplane and milling operations were commenced in June.

Two important events took place in 1938 in the Rouyn-Harricana region: a vocational mine-school was organized in Abitibi by the Quebec Bureau of Mines and the Quebec Youth Aid, with the assistance of the Federal authorities; and a branch of the Canadian National Railways from Senneterre to Rouyn, in Abitibi and Temiscamingue counties, was completed and opened to traffic.

For the mine-school, the property of the Gale Gold Mines Limited was acquired by the Provincial Government, situated four miles west of the town of Val d'Or. Work had been suspended at this mine since 1936. A mining plant had been installed, a shaft had been sunk to a depth of 275 feet, and two levels had been established at 125 feet and at 250 feet, with 3,810 feet of lateral workings, by the former owners. This mining property, after it was purchased in February, 1938, for a mine-school, was unwatered, the mining plant was repaired and put in good order, additional machinery was set up, the old buildings were repaired and new ones erected, among which was a bunkhouse to lodge 100 miner apprentices.

The apprentices carry out working, drilling, blasting, timbering, and other underground work under the guidance of expert miners, and after a six months course they are prepared to work in operating mines at the regular current wages.

In March, 1939, the number of apprentices who had registered at the mine-school throughout the year was 130, of whom 22 had already been placed at remunerative work in operating mines of the region, 70 were in training at the mine-school and the balance abandoned the course for various reasons.

In December, 1938, the branch line of the Canadian National Railways, from Rouyn to Senneterre, was opened to traffic, with the usual formalities, by the Honourable C. D. Howe, Federal Minister of Transport, who drove the last spike in the road bed, and the Honourable Onesime Gagnon, Quebec, Minister of Mines and Fisheries, who cut the official ribbon.

This line, which is 101 miles in length, serves ten townships, in which there are at present 16 operating mines with an aggregate milling capacity of approximately 5,600 tons a day, which previously had no direct means of railway communications.

In the course of the year the total network of mine roads in the Western Quebec gold mining field was substantially extended. From a total of 669 miles of such roads on January 1, 1938, it was increased to 765 miles during the year.

The Quebec Bureau of Mines has charge of seeing to the establishment, regulating and the town planning of mining villages in new mining districts, in order to guard against abuses and

speculations detrimental to public welfare and to the mining industry. Under this item, in 1938 the village-site of Cadillac was established in January, by Order in Council, in Cadillac township. The demand for building lots was so keen that later on additional territory was subdivided and the construction of municipal works is being studied.

The problem of the agglomeration of buildings which was locally called Stadacona village, in Rouyn township, was solved by the establishment of the village of Rouyn-Sud in June.

The mining development at the Perron and the Cournor mines and vicinity, necessitated the establishment of a townsite in July, 1938, to which the name of Pascalis Village was given.

The question of the creation of a mining village in Guillet township, in the vicinity of the Belleterre mine, was being studied at the end of the year.

The growth of the village of Bourlamaque necessitated an additional subdivision of its territory into building lots. In the neighbouring town of Val d'Or municipal works were constructed: water-supply, sewers and roads.

Ontario Gold Mining Industry, 1938

(A. C. Young, Ontario Department of Mines)

While the underground development in gold mining in the province in 1938 compared favourably with that of the previous year, there was a decided decline in diamond-drilling and also in the recording of mining claims. The following data cover some of the more important happenings in the different mining areas.

Porcupine.—In June, the Hallnor mine was brought into production, this being one of the highest grade mines in Ontario. Porcupine Lake also started producing in June. Mill construction was under way at Preston East Dome, capacity 300 tons. Other operations were: Augite, Broulan, Faymar, and Naybob which enlarged its mill. Employment by producing mines in the Porcupine area in 1938 totalled 7,557 men who drew \$13,133,550 in wages. These figures are considerably above the high points made in 1937.

Kirkland Lake.—Milling was commenced by Golden Gate in June, while the older established mines continued at capacity. Mine development in this area has now reached a considerable depth, e.g. at Wright-Hargreaves No. 5 winze was sunk to 6,400 feet. Lake Shore commenced operating a roasting plant of 50 tons capacity. Many prospects formerly operated were idle in 1938. To the east, however, the Upper Canada property continued developing good ore, and this company commenced milling, using the idle Morris mill. Employment at producing mines continued to expand, but with large waiting lists of applicants. The total payroll for all producing properties was 4,560 to whom was paid \$7,880,132.

Larder Lake.—Three companies were actively milling in this area, while diamond-drilling or surface exploration was carried on some seven or eight other claims. Sinking was under way at Fernland, Cheminis, Barber-Larder, Chesterville, and Martin-Bird. Employment at producing mines totalled 537 and wages amounted to \$775,465. The Boston Creek-Skead area, which adjoins Larder to the south and west, was more or less quiescent with little work being done.

Sudbury-Timagami-Shiningtree.—This area is of considerable extent in length and more properly might be divided into three groups. Apart from the steady production of three mines—New Golden Rose, Lebal-Oro, and Tionaga—mining operations were confined to Tyrante, Matona, Beanland, and Hermiston, in Timagami, while in Shiningtree, Pilmae built a 75-ton mill before closing down in September and Ronda was active in the construction of a 125-ton plant, also constructing a 14-mile power line.

Matachewan.—Apart from the steadily producing Young-Davidson and Matachewan Consolidated, there were no operations of any considerable size. Properties on which work was done in former years were reported idle.

Algoma.—This area includes Michipicoten and Goudreau and for many years has been a small producer of gold. None of the mines have, so far, been developed to large capacities. In 1938, however, the C line was opened to the 500-foot level and in July a 200-ton cyanide plant was tuned in and is now in steady operation.

Thunder Bay.—Producing mines rose in number from 8 to 11 in 1938, while other operations both surface and underground totalled 27, as compared with 41 in 1937. The general decline in this area is indicative of the reaction of capital to the unsettled world political conditions. During the year, MacLeod-Cockshutt commenced milling at the rate of 300 tons which shortly was increased to 500 tons. Hardrock also started at 240 tons, and Magnet commenced shipping ore to the Tombill mill. Other producing properties brought in in previous years continued operating.

Kenora and Rainy River.—The Wendigo on Lake of the Woods and Straw Lake Beach operated their milling plants, the latter having been constructed during the year. Kenricia completed mill foundations for a 100-ton cyanide plant which was also intended to treat any custom ores available. Development was actively carried on at Split Lake, Big Master, Selby, and Elora properties. Kenopo Mining and Milling Company built a small 25-ton mill at Norman, two miles west of Kenora to treat high-grade ores from High Lake near the Manitoba border.

Patricia Portion.—In May, 1938, the Sachigo River Exploration Company tuned in a 25-ton mill. This is the highest grade mine in Ontario and is unique in that many Indians are employed on surface, as woodcutters, rock pickers, crusher men, etc. Other developments were, Berens River Mines, where a 225-ton mill was planned, for which a power site on Dark River about 8 miles from the mine was to be developed. The Hasaga, a new company, covering an area west of Howey, took over the mill of the Red Lake Gold Shores which had been closed in August. Howey, Madsen, McKenzie Red Lake were active throughout the entire period and J-M Consolidated closed down its mill from March 1 to August 15. Central Patricia and Pickle Crow operated all year, the former having additional ore delivered by truck from the adjoining Springer. Jason Gold Mines took over the assets of the Argosy, and with steady, favourable development at the Uchi Mine, preparations were commenced for mill construction.

Manitoba Gold Mining Industry, 1938

(Geo. E. Cole, Director of Mines, Manitoba)

The production of gold in Manitoba during 1938 totalled 185,706 ounces as compared with 157,949 ounces for 1937.

The year 1938 was marked by a steady production at the operating mines. Apart from the gold quartz mines, gold was obtained from the treatment of base metal ores of the Flin Flon and Sherritt Gordon mines. It is to these latter properties that the increase in gold production for 1938 is due.

Developments at the San Antonio mine have been very satisfactory at depth and the company showed greater ore reserves than at any time in its history. During the year San Antonio and Gunnar companies continued their payments of dividends to shareholders.

Unfortunately there was no improvement in the prospecting situation during the year. With continued unsettled conditions in the money markets of the world funds have not been available for the prospector with a consequence that there has not been the exploration in the past year that Manitoba's Precambrian deserves. However, attention to geological work has been continued, both the Dominion and the Province having parties in the field during the past year.

Saskatchewan's Gold Mining Industry, 1938

(E. Swain, Supervisor of Mines, Saskatchewan)

Gold production during 1938 was 50,021 fine ounces as against 65,886 ounces in 1937, being a decrease of 15,865 ounces.

The reduction of gold output was due to a lesser recovery of this metal from the complex ore at Flin Flon and to the temporary closing down of the mill at Amisk Lake.

Eighteen ounces of placer gold is included in the total, which was recovered from the North Saskatchewan River in the Western Central portion of the province.

The Consolidated Mining & Smelting Company's 1,000-ton mill on the "Box" property at Lake Athabaska has been completed, but it will not come into operation until hydro-electric power is available, which is expected to be in the fall of this year. When the power is available, the company will, in addition to milling its own ore, take ore from Athona Mines (1937) Limited mine, which is about 2 miles southeast of the mill and immediately south of the town of Goldfields.

Lack of finances prevented Flin Flon Gold Mines Limited installing the necessary roaster and coming into production, which was also the case with other companies interested in developing properties in the vicinities of Flin Flon and Amisk Lake.

The Sulphide Lake area 6 miles north of Lac la Ronge was very active, much staking has been done and considerable surface work completed. Substantial mining companies are interested in this area, and recently one company took in 60 tons of equipment for prospecting. A trial shipment of ore gave good recovery value.

A mining road is being constructed, which will greatly facilitate the problem of taking in machinery supplies from Prince Albert, a distance of about 190 miles.

The Hudson Bay Mining & Smelting Company has commenced sinking a second main operating shaft to serve the southern portion of the known ore reserves. It is anticipated that the 3,250-foot level will be reached by 1941, but it is being equipped to continue to the 4250-foot level when required. Work has also been commenced for an additional unit of 19,000 h.p., which is to be added to the hydro-electric plant at Island Falls, which, when completed, will raise the capacity to 90,000 h.p.

British Columbia Gold Mining Industry, 1938

(Philip B. Freeland, Chief Mining Engineer, B.C. Department of Mines)

The Polaris-Taku Mining Co. Ltd., operating on the Tulsequah River in the Atlin Mining Division went into production by treating 59,260 tons of ore in their mill that had been completed late in 1937. In the Portland Canal area the Big Missouri mine, owned by the Buena Vista Mining Co. Ltd., and controlled by the Consolidated Mining and Smelting Company of Canada, Ltd., produced the first gold brick in March. During the year 154,387 tons of ore were treated in the mill, one outstanding feature of which is that it is entirely underground. Silbak Premier Mines Ltd. continued their operations and mined and milled 184,606 tons of ore. The Surf Inlet Consolidated Gold Mines Ltd. in the Skeena Mining Division produced 17,418 tons of ore.

In the Cariboo District, the Cariboo Gold Quartz Mining Co. Ltd. increased its milling rate towards the end of the year to 300 tons per day. A total of 102,539 dry tons of ore was milled with a production of 42,808 oz. of gold and 3,249 oz. of silver. Island Mountain Mining Co. Ltd. operated continuously throughout the year, treated 44,916 tons of ore and produced 18,351 oz. of gold and 2,637 oz. of silver. Towards the end of the year the Cariboo Hudson Gold Mines Ltd. commenced production. In addition a small pilot mill was erected and put into operation by the Quesnelle Quartz Mining Co. Ltd.

In the Similkameen and Osoyoos area, the Kelowna Exploration Co. Ltd., Hedley Mascot Gold Mines Ltd., Fairview Amalgamated Gold Mines Ltd., and Osoyoos Mines Ltd., continued operations.

In the Nelson area the main producers were the Reno, Sheep Creek, Second Relief and Kootenay Belle mines, and a new producer in the Gold Belt. Production from the Ymir Camp was curtailed through the closing down of the Ymir Centre Star operated by Wesko Mines Ltd., and the Howard, operated by Durango Mines Ltd. Operations were continued at the Clubine-Comstock but the Bayonne property was closed down at the end of the year with the ore apparently depleted.

In the Bridge River area, Bralorne Mines Ltd. continued operations and Pioneer Gold Mines of British Columbia, Ltd., milled 123,304 tons of ore.

Both Vidette Gold Mines Ltd. and Ashloo Gold Mines Ltd. continued their operations.

In the Zeballos area, Privateer Mines Ltd. produced their first gold brick from their newly completed mill in October. Other production from the area came from shipments of ore from Central Zeballos Gold Mines Ltd. and the Rimy group. Rey Oro Gold Mining Co. Ltd. operated a 10-ton Sundfelt mill. A greater production is anticipated in 1939 from the mills now under construction.

The British Columbia Department of Mines and Department of Labour continued the plan created in 1935 whereby unmarried, physically fit, unemployed men were given the opportunity to learn placer mining. In 1939 the age limit was increased and one hundred and fifty men between nineteen and twenty-six were permitted to enroll. Instruction embraced geology, mineralogy, field cooking, the use of all kinds of tools required in the hills, building cabins, making maps and running surveys. Further instruction in geology of three months in the field will be given to those qualified, so that these young men might be trained as prospectors. It is hoped that the mining industry will employ some of these men in the mines during the winter so that they can obtain a grub stake for the following summer.

The idea of training men entirely for placer mining has been discontinued and instruction in this subject has been given only as part of the main course. Those who do not qualify for the extra field season will be given an opportunity to go prospecting for themselves.

Lode Gold Mining in the Dawson District, Yukon

(G. A. Jeckell, Controller, Lands, Parks and Forests Branch, Department of Mines and Resources)

Fifteen Quartz Grants were issued in the Dawson District during the year. Three hundred and eight claims were renewed. This is a decrease from the previous year.

In the Mount Free Gold District, Messrs. Richards and Keobke of Whitehorse became interested first in property held by Teare and Miller, and using a primitive type crushing device extracted a gold brick weighing eighty odd ounces from an exposed vein on their property. They then took a working option on the "LaForma" Group of claims, which was at one time prospected by the Timmins interests, and later by The Yukon Consolidated Gold Corporation, Limited. A 10-ton mill has been installed, with a six cell flotation plant, and some test runs have been made, but owing to lack of water the mill could not be run continuously. In the first run of thirty-three shifts of eight hours each, production consisted of a bullion bar weighing 143 ounces, which their Assayer claimed ran eight per cent silver, two per cent base metal, leaving 128 ounces of fine gold. The second run of ten days produced a brick weighing 88.85 ounces. There was also produced ten tons of concentrates averaging six ounces of gold to the ton, and after the installation of the flotation cells, three tons of concentrates averaging approximately thirty-five ounces of gold to the ton. The operators plan to enlarge the capacity of their mill this season to twenty-five tons per day. Sufficient ore of the same grade as that milled is now in sight to keep the mill running full time for a year, and development work is also being done on this property, and prospectors are returning to this area.

The Assay Office was maintained as usual at Keno in the Mayo District by the Territorial Government. 1,282 samples of rock for assay were received from all parts of the Territory, and 1,925 assays or quantitative analyses were made. In addition to this numerous qualitative determinations and chemical tests were made in connection with the identification and classification of the various rocks and minerals of which no record was made. The assays made were, gold and silver, 1,282; lead 633; copper 7; and molybdenum 3.

Gold Mining in the Northwest Territories, 1938

(By A. W. Jolliffe, Department of Mines and Resources)

Interest in gold lode deposits in the Northwest Territories centers about Yellowknife on the north arm of Great Slave Lake where the Con and Negus mines began production in 1938. During the year the Yellowknife region was very actively prospected and some 3,500 claims were filed. In this region of about 12,000 square miles upwards of one hundred veins carrying visible gold have been found, chiefly within the past two years, and many of these discoveries were under active development in 1938. The more active districts are: Yellowknife Bay, North Yellowknife, Gordon Lake, Beaulieu River, Francois River, Russell Lake, and Wray Lake.

Yellowknife Bay.—Most of the gold-bearing veins in the Yellowknife Bay district are in sheared zones in volcanic rocks.

At the Con-Ryeon mine, operated by Consolidated Mining and Smelting Co. of Canada Limited, the first gold production from the Northwest Territories was recorded on September 5, 1938, when a brick of 72½ lbs. was poured. From that date until the end of the year 6,794 troy ounces of gold were produced, valued at approximately \$240,000. The mill capacity was initially 100 tons of ore a day but this has been increased to 115 tons a day. The three-compartment vertical shaft at this mine is down to 500 feet with levels developed at 125-foot intervals. So far the ore has been drawn from two veins but a 2,200-foot crosscut on the 500-foot level now connects the shaft with the main Ryan vein which is under development. About 150 men are continuously employed at this property. The process used in the mill is straight cyanidation.

The 50-ton mill at the property of Negus Gold Mines Limited was completed early in 1939 and the first gold brick was poured in February. By July, 1939, this mine was producing at the rate of about 1,700 ounces of gold a month at the present mill capacity of 60 tons a day. The method of extraction is cyanidation. The 3-compartment vertical shaft is down to 300 feet. The ore is being drawn from four of the several veins on the property.

Diamond drilling and surface work were carried on at the Fox group, the Kam and Aye groups controlled by Kamlac Gold Mines, various groups belonging to Chan Yellowknife Mines, the Meg and P.R.W. groups of Yellowrex Mines, and the Lily-Jack claims. On the last-named, Ptarmigan Gold Mines (a subsidiary of C.M. & S. Co.) put down a 3-compartment vertical shaft to a depth of 300 feet by June, 1939, and had completed 500 feet of lateral work on the 150- and 300-foot levels by this date. A prospect shaft is also being sunk on the Giant claims controlled by Bear Exploration and Radium Limited.

North Yellowknife.—Around Moberly, Clan, and Sito Lakes on the Yellowknife River some 30 miles north of its outlet, development work was done on gold-bearing veins discovered during the latter half of 1937. The deposits lie in volcanic and sedimentary rocks cut by altered gabbroic sills and traversed by the northward extension of the Yellowknife Bay major fault system.

Six veins carrying visible gold were found on a large block of claims held by Territories Exploration Limited. Surface development work was carried out on these and on nearby claims, including the Lil and Lilex groups under option to Oro Plata Mining Corporation, and the Anne group held by International Mining Corporation.

At the main showing on the Mon group (C.M. & S. Co.), a vertical prospect shaft was put down to a depth of 65 feet and 160 feet of lateral work was done at this level in an effort to trace the downward extension of a high grade quartz lens which at the surface measured 50 feet long and up to 20 feet wide.

Gordon Lake.—Gordon Lake lies 50 miles northeast of Yellowknife within a wide belt of sedimentary rocks extending south for 40 miles and surrounding McDonald, Murray, Pensive, and Thompson Lakes. Many of the gold deposits within this belt appear to be controlled by folded structures in the sediments.

The original discovery at Gordon Lake has been developed by Camlaren Mines Limited. A shaft was put down to a depth of 380 feet and more than 1,000 feet of lateral work has been done on levels established at 200 and 350 feet. Not sufficient ore has yet been indicated to justify the 50-ton mill which had been contemplated. Two other veins on this property lie within one mile of the shaft. On one of these a prospect shaft was sunk to a depth of 200 feet during the summer of 1938. The other vein was diamond drilled during the following winter.

A few miles west of Gordon Lake, Sentinel Mines trenched two large quartz bodies one of which contains visible gold. Within a distance of 5 miles north of these discoveries C.M. & S. Co. have done some surface work on three claim groups on Murray and McDonald Lakes, and diamond drilling on one of these, the Try-Mc group. There a quartz vein averaging 10 feet wide and in places carrying visible gold is exposed at intervals for a total length of 2,500 feet.

Around Pensive Lake, 15 miles south of Gordon Lake, a number of gold discoveries have been made. Included in the holdings in this vicinity are those of Dome Mines, Chan Yellowknife Gold Mines, Borealis Gold Mines, and Canadian Mining and Smelting Company, Ltd. On the Dome Mines property surface sampling indicated a gold content of 0.24 ounce a ton throughout a quartz body 225 feet long and averaging 23 feet in width. Twenty-three diamond drill holes totalling nearly 4,300 feet were put down under this body and indicated somewhat lower and more erratic values than the surface sampling.

The initial gold finds on Thompson Lake were made on July 22, 1938. Two of the claim groups then staked (Waco and Kim) are being developed by Thompson-Lundmark Gold Mines Limited. Two veins on this property have been diamond drilled. Of these the Kim vein has a dip of 50 degrees to the northeast and was traced on the surface for 1,250 feet. The diamond drilling extended this length a further 500 feet and proved the continuity of the vein to a depth of 400 feet. Surface sampling showed several ore sections, one of which was 450 feet long averaging 0.878 ounce gold a ton across 25.8 inches of quartz. An incline shaft was started about the centre of this shoot early in 1939 and had reached a slope depth of 300 feet by May, with levels established there and at 150 feet. Drifting on the first level for 104 feet indicated an ore shoot averaging 1.35 ounces gold a ton across 1.37 feet of quartz.

Numerous other claims were staked around Thompson Lake and on some of these quartz veins carrying visible gold have been reported.

Beaulieu River.—A number of gold-bearing veins have been found around Sunset Lake on Beaulieu River about 70 miles northeast of Yellowknife. Only surface work has been done on these. One deposit is reported to consist of quartz lenses up to 18 inches wide in a sheared zone up to 20 feet wide which has been traced for 2,000 feet through volcanic rocks. Some of the quartz carries visible gold.

Francois River.—About 200 claims were staked during 1938 on gold veins found near the headwaters of Francois River around Francois and Blatchford Lakes 60 miles east of Yellowknife. The country rocks are altered sediments. One vein on the Jade group of C.M. & S. Co. is reported to consist of quartz stringers and lenses aggregating 20 feet in width along a sheared zone up to 40 feet wide. Visible gold has been found in some of the quartz.

Russell Lake.—Some diamond drilling was done during 1938 at the main showing on the Deloro group of claims staked in 1937. These claims lie on Snare River a short distance above Russell Lake which is 60 miles northwest of Yellowknife. On an island in Mosher Lake, a few miles east of Russell Lake, gold was found in 1938 by the Almo Prospecting Syndicate in a wide quartz stringer lode.

Wray Lake.—In the late fall of 1938 a number of gold discoveries were made around Wray Lake which lies 120 miles northwest of Yellowknife. The initial finds were made by Territories Exploration Limited. Further discoveries have since been made by Inspiration Mining and Development Company and others.

The Mining Recorder at Fort Smith in a report dated May 30, 1939, states:—"During the summer peak it was estimated that there were over 800 white people in the Yellowknife District and during the winter there were 350 in the settlement and 300 at the mines in the area. Boat transportation in the MacKenzie district reached a record high in 1938 due to increased tonnage of freight shipped to the Yellowknife area. Fuel oil from Fort Norman was brought up river for use at the mines. In April freight was delivered by tractors and sleighs at Yellowknife from Grimshaw, Alberta, over the new winter tractor road via Hay River. Aeroplane transportation was maintained by three well-known companies. One new coal location was staked eight miles above Fort Norman and prospectors were in the Hay River area in 1938 hunting for coal locations with a hope of finding fuel for use at Yellowknife."

Table 37.—Principal Statistics of the Auriferous Quartz Mining Industry in Canada, 1938

	Number of active operators	(a) Number of operating plants or mines	Capital employed	Number of employees	Salaries and wages	Cost of fuel and electricity	Cost of process supplies used (b)	Value of freight paid on shipments of ore, slag, etc.	Smelter and refinery treatment costs	Gross value of bullion, ore, concen- trates or residues shipped from mines	Net value of bullion, ore, concen- trates or residues shipped from mines
1938—			\$		\$	\$	\$	\$	\$	\$	\$
Nova Scotia.....	22	22	1,466,958	508	507,806	83,714	226,186	2,889	11,401	937,504	613,314
Quebec.....	168	169	47,027,201	5,471	8,407,383	1,525,816	2,859,264	76,649	438,177	20,315,407	15,415,501
Ontario.....	184	188	167,836,682	18,528	32,855,073	4,760,388	11,756,920	113,310	1,160,724	99,364,887	81,573,525
Manitoba.....	12	12	6,753,890	744	1,269,044	235,750	425,765	8,257	43,789	3,653,893	2,940,302
Saskatchewan.....	5	6	556,786	210	358,005	90,244	71,542	.....	.....	.....	(-161,786)
British Columbia.....	128	137	23,594,406	3,879	6,494,431	686,023	2,684,212	388,164	618,709	18,635,187	14,258,079
Northwest Territories (†).....	15	15	3,966,489	304	569,660	112,603	290,211	838	2,825	240,053	(-166,429)
Yukon.....	1	1	1,500	3	690	.....	400	.....	.....	.....	(-400)
Canada.....	535	550	251,293,892	29,647	50,462,092	7,494,573	18,314,500	590,107	2,275,625	143,146,911	114,472,406

NOTE.—The value of fuel, purchased electricity and process supplies used was deducted from the value of shipments for the first time in 1935; this was done in order to attain a more accurate approximation of a net value, however, freight and treatment charges on all shipments of ores and concentrates have been deducted in all years.

(†) Not including data relating to operations of Negus Mines Ltd.

(a) Number of producing mines in 1938 was 226.

(b) Explosives, chemicals, etc.

Table 38.—Ores Mined and Milled, Crude Bullion Recovered and Crude Bullion and Concentrates Shipped in the Auriferous Quartz Mining Industry, 1938

(Ton=2,000 pounds)

	Nova Scotia	Quebec	Ontario	Manitoba	Saskat- chewan	British Columbia	North- west Terri- tories	Canada
Number of producing mines	18	26	77	8		96	1	226
Ore mined..... tons	203,550	2,695,375	9,934,066	352,629	17,640	1,529,033	17,356	14,749,649
Material discarded (sorted) tons	38,877	118,361	277,371	27,627		66,460		528,696
Ore milled..... tons	175,760	2,605,799	9,603,679	324,967		1,434,517	13,833	14,158,555
Trailings retreated..... tons	40	10,046	3,600	450		50,790		64,926
Concentrates produced..... tons	1,260	3,149	3,840	110		49,763		58,122
Gold content of ores, slags, residues and concentrates shipped—								
To Foreign smelters, fine oz.	161	2,968	1,573	112		169,243		174,057
To Canadian smelters fine oz.		29,384	6,164	5		26,427		61,980
Bullion bars shipped—								
Gold content..... fine oz.	26,399	546,068	2,796,456	103,154		303,896	5,467	3,781,440
Silver content..... fine oz.	974	128,221	513,822	51,011		105,631	954	800,613
Bullion produced by amalgamation..... crude oz.	28,223	111,497	301,477	40,194		139,019	1,833	622,243
Bullion produced by cyanidation..... crude oz.	2,275	643,380	3,324,764	134,603		311,611	7,111	4,423,744
Total bullion pro- duced..... crude oz.	30,498	754,877	3,626,241	174,797		450,630	8,944	5,045,987
Content of bullion bars produced—								
Gold..... fine oz.	26,399	543,537	2,808,391	103,154		322,367	6,794	3,810,642
Silver..... fine oz.	974	128,212	523,438	51,011		111,575	1,256	816,466
Value (standard)..... \$	546,140	11,289,910	58,278,336	2,154,027		6,720,396	140,981	79,129,790
Exchange premium on bul- lion bars produced..... \$	383,529	7,896,595	40,792,639	1,495,816		4,690,571	99,072	55,358,222
Value of ores, concentrates, slags and residues sold. \$	7,835	1,128,902	293,892	4,050		7,224,220		8,658,899
Total gross value of production..... \$	937,504	20,315,407	99,364,867	3,653,893		18,635,187	240,053	143,146,911
Value of fuel, electricity and process supplies used also freight on shipments, marketing, smelter and refining charges..... \$	324,190	4,899,906	17,791,342	713,591	161,786	4,377,108	406,482	28,674,805
Net value of produc- tion..... \$	613,314	15,415,501	81,573,525	2,940,302	(-161,786)	14,258,079	(-166,429)	114,472,106

*Includes \$400 spent by one mine in the Yukon.

Table 39.—Ores, Concentrates and Slags Shipped from the Auriferous Quartz Mines in Canada, 1938

	Ontario mines shipping		Nova Scotia, Quebec, and Manitoba mines shipping		British Columbia mines shipping		Canada
	To Canadian smelters	To Foreign smelters	To Canadian smelters	To Foreign smelters	To Canadian smelters	To Foreign smelters	
Number of mines.....	21	4	8	4	55	35	127
Tons of ore, etc., shipped.....	1,871	917	161,060	1,281	17,887	44,356	227,372
Metal content—							
Gold..... oz.	6,164	1,573	29,389	3,241	26,427	169,243	236,037
Silver..... oz.	616	1,308	348	101	146,880	962,456	1,111,709
Copper..... lb.	26,500	276,913				459,892	763,305
Lead..... lb.						(a)	
Antimony..... lb.				24,560	(b)		24,560
Value—Gross... \$	216,588	77,304	1,028,433	112,354	970,070	6,254,150	8,658,899

(a) Some gold ores exported contain relatively large quantities of lead which are not reported by the producer; this lead is reported by the U.S. Smelters and 60% is credited to Canadian lead production.

(b) Antimony recovered from Canadian ores in Canadian smelters is not usually reported by mine operators.

Table 40.—Specified Costs per ton of Ore Milled at Certain of the Principal Auriferous Quartz Mines in Canada, 1938

Name of Mine	Develop- ment and exploration (a)	Mining	Milling	General (b)	Total cost per ton (c)
NOVA SCOTIA					
Seal Harbour Gold Mines Ltd.....	\$ 0.42	\$ 1.06	\$ 0.60	\$ 0.50	\$ 2.58
QUEBEC					
Arntfield Gold Mines Ltd.....	0.630	1.815	0.868	0.740	4.053
Beattie Gold Mines (Quebec) Ltd.....	0.320	0.619	0.975	0.338	2.252
Bellettre Quebec Mines Ltd.....	2.316	2.035	1.891	1.729	7.971
Cournor Mining Co. Ltd.....	0.537	2.095	1.202	0.092	3.926
Francoeur Gold Mines Ltd.....	0.23	1.54	0.82	1.42	(d) 4.01
Lake Rose (Que.) Mines Ltd.....	2.00	7.65	9.40	3.12	20.17
Lamaque Mining Co. Ltd.....	2.00	2.42	0.74	1.51	6.67
Lapa Cadillac Gold Mines Ltd.....	0.19	1.70	0.87	0.63	3.39
McWatters Gold Mines Ltd.....	2.69	1.67	1.84	1.21	7.41
O'Brien Gold Mines Ltd.....	1.99	2.38	1.74	1.62	7.73
Perron Gold Mines Ltd.....	2.033	2.821	0.959	0.754	6.567
Sigma Mines Ltd.....	1.16	1.80	0.66	0.29	(e) 3.91
Siseco Gold Mines Ltd.....	0.7846	1.9674	1.0627	0.7837	4.5984
Thompson Cadillac Mining Corp.....	0.50	1.50	1.00	0.64	3.64
ONTARIO					
Porcupine District—					
Buffalo Ankerite Gold Mines Ltd.....	0.419	2.717	0.815	0.540	4.491
Dome Mines Ltd.....	0.95	1.59	1.07	1.89	5.50
Hollinger Consolidated Gold Mines Ltd. (Ross).....	1.011	2.347	1.455	1.025	5.838
Hollinger Consolidated Gold Mines Ltd. (Timmins).....	1.021	2.596	0.638	1.224	5.479
McIntyre Porcupine Mines Ltd.....	0.558	3.484	0.781	0.964	5.787
Pamour Porcupine Mines Ltd.....	1.09	1.18	0.57	0.22	3.06
Paymaster Consolidated Mines Ltd.....	1.40	2.47	0.94	0.31	5.12
Kirkland Lake District—					
Bidgood Kirkland Gold Mines Ltd.....	2.82	4.08	1.46	0.78	9.14
Kirkland Lake Gold Mining Co. Ltd.....	1.24	3.23	1.19	1.04	(f) 6.70
Macassa Mines Ltd.....	1.84	2.71	1.38	1.96	7.89
Teck-Hughes Gold Mines Ltd.....	(g) 3.79	0.99	1.29	6.07	
Wright-Hargreaves Mines Ltd.....	(h) 4.548	1.248	2.720	8.516	
Larder Lake District—					
Kerr-Addison Gold Mines Ltd.....	1.31	1.16	(i) 0.96	0.43	3.86
Raven River Mines Ltd.....	2.49	2.12	1.35	0.26	6.22
Matachewan District—					
Hollinger Consolidated Gold Mines Ltd. (Young-Davidson).....	0.2837	1.1215	0.5973	0.3652	2.3677
Matachewan Consolidated Mines Ltd.....	1.072	1.658	0.902	0.511	4.143
Sudbury District—					
Lebel Oro Mines Ltd.....	0.209	2.211	2.493	0.318	(m) 5.231
Consolidated Mining and Smelting Company of Canada, Limited (Golden Rose).....	3.77	4.67	2.24	10.68	
Algoma District—					
Algoma Summit Gold Mines Ltd.....	1.17	1.22	0.84	0.40	3.63
Cline Lake Gold Mines Ltd.....	1.09	2.62	1.18	1.35	6.24
Minto Gold Mines Ltd.....	1.77	1.52	(j) 2.43	0.85	6.57
Thunder Bay District—					
Bankfield Consolidated Mines Ltd.....	2.7226	2.2086	1.6372	1.5900	8.1584
Leitch Gold Mines Ltd.....	3.69	5.19	1.78	1.10	11.76
Sand River Gold Mining Co. Ltd.....	1.30	6.45	1.52	0.21	9.48
Sturgeon River Gold Mines Ltd.....	1.778	6.616	1.819	1.152	11.365
Kenora District—					
Wendigo Gold Mines Ltd.....	1.71	4.15	2.13	1.19	9.18
Paricia District—					
Central Patricia Gold Mines Ltd.....	1.96	2.52	1.58	1.98	8.04
McKenzie Red Lake Gold Mines Ltd.....	2.34	2.18	1.24	2.05	7.81
Pickle Crow Gold Mines Ltd.....	1.34	3.58	1.03	0.79	6.74
Sachigo River Exploration Co. Ltd.....	7.595	6.984	7.950	5.454	27.983
MANITOBA					
God's Lake Gold Mines Ltd.....	1.774	2.370	(k) 1.796	1.202	7.142
Gurney Gold Mines Ltd.....	0.278	2.714	2.233	1.650	6.875
Laguna Gold Mines Ltd.....	1.37	6.00	2.22	1.08	10.67

Table 40.—Specified Costs per ton of Ore Milled at Certain of the Principal Auriferous Quartz Mines in Canada, 1938—Concluded

	Development and exploration (a)	Mining	Milling	General (b)	Total cost per ton (c)
BRITISH COLUMBIA					
Ashloo Gold Mines Ltd.....	2-25	3-90	(d) 2-38	3-02	11-55
Bayonne Cons. Mines Ltd.....	2-95	4-19	3-53	3-08	13-75
Bralorne Mines Ltd.....	1-6641	2-9627	0-7108	1-8557	7-1933
Buena Vista Mining Co. Ltd.....	0-09	0-92	1-03	.....	2-04
Fairview Amalgamated Gold Mines Ltd.....	0-31	1-38	(j) 1-45	0-72	(d) 3-86
Hedley Mascot Gold Mines Ltd.....	.....	1-56	(d) 1-48	2-92	5-96
Island Mountain Mines Co. Ltd.....	3-48	3-22	2-53	(l)	9-23
Kootenay Belle Gold Mines Ltd.....	1-75	(j) 4-24	1-36	1-99	9-34
Osoyoos Mines of Canada, Ltd.....	0-24	0-51	1-15	0-53	2-43
Pioneer Gold Mines of B.C. Ltd.....	0-774	2-614	1-044	2-890	8-322
Polaris-Taku Mining Co. Ltd.....	0-985	2-659	1-363	1-722	6-729
Privateer Mine Ltd.....	1-62	3-32	2-73	1-30	8-97
Reward Mining Co. Ltd.....	1-09	2-71	(d) 3-13	3-82	10-75
Sheep Creek Gold Mines Ltd.....	2-289	3-016	1-508	0-990	7-803
Wesko Mines Ltd.....	0-26	3-12	2-38	0-74	6-50
Ymir Yankee Girl Gold Mines Ltd.....	0-718	2-626	1-690	1-074	6-105
NORTHWEST TERRITORIES					
The Consolidated Mining and Smelting Company of Canada, Limited (Con.).....	.....	9-76	3-67	0-26	13-69

(a) Exclusive of outside exploration.

(b) Marketing, head office, taxes, etc.

(c) Depreciation not included.

(d) Values recovered at smelter.

(e) Not including interest on loans or preliminary development written off.

(f) Not including taxes.

(g) Including development.

(h) Includes development, exploration, transporting ore and pumping.

(i) Commenced May 2nd.

(j) Includes trucking.

(k) Includes crushing and conveying.

(l) Included with other data.

(m) Salvage operations.

Table 41.—Certain Data Relating to the Production of Gold by the Entire Auriferous Quartz Mining Industry in Canada, 1928-1938

Year	Ounces of gold produced per wage-earner year	Cost of fuel and electricity per ounce of gold produced	Cost of wages per ounce of gold produced	Cost of explosives and other process supplies used per ounce of gold produced	Cost of freight and smelter-refinery treatment on ores and bullion shipped per ounce of gold produced	Total of specified costs
	Ounces	\$	\$	\$	\$	\$
1928.....	206	1.47	7.45	Information not available	Information not available	.....
1929.....	218	1.46	7.18	.....	.....	.....
1930.....	237	1.25	6.63	.....	.....	.....
1931 (a).....	250	1.19	6.50	1928	1928	.....
1932.....	255	1.21	6.31	to	to	.....
1933 (b).....	207	1.36	7.45	1934	1936	.....
1934 (c).....	154	1.71	9.64	.....	.....	.....
1935.....	146	1.89	10.48	4.38	.....	16.75
1936.....	137	1.98	11.32	4.46	.....	17.76
1937.....	132	2.10	12.18	4.65	(d) 0.33	19.26
1938.....	150	1.85	10.95	4.53	0.56	17.89

(a) Equalization exchange premiums paid by the Dominion Government to gold miners (Great Britain goes off gold standard).

(b) United States goes off gold standard.

(c) United States gold dollar reduced in weight from 25-8 to 15 5/21 grains, 0-9 fine.

(d) Not including Mint charges and marketing.

NOTE.—The data contained in the foregoing table have been compiled from reports received from both producing and non-producing (exploring and developing) operators in the auriferous quartz mining industry. This fact should be noted if the information is to be construed or employed as possible criteria for technological or other statistical study. The trends revealed are not to be interpreted as entirely reflecting "cause and effect" in the operation of producing mines only but rather as indices of change in the industry as a whole.

Table 42.—Gold Content of Bullion, Ores, Concentrates, Etc., Shipped and Ore Milled by Auriferous Quartz Mines in Canada, with Average Price of Gold in Canadian Funds, 1929-1938

Year	Tonnage treated (*)	Gold content fine oz. (†)	Oz. of fine gold per ton	Average price of gold \$
1929.....	4,371,143	1,771,526	·41	20.67
1930.....	4,429,906	1,884,791	·43	20.67
1931.....	5,526,379	2,271,278	·41	21.55
1932.....	5,997,492	2,502,327	·42	23.47
1933.....	6,480,164	2,455,365	·38	28.60
1934.....	7,524,803	2,490,513	·33	34.50
1935.....	8,907,610	2,645,659	·30	35.19
1936.....	10,510,750	3,095,427	·29	35.03
1937.....	(a)11,919,965	3,490,170	·29	34.99
1938.....	(a)14,335,377	4,046,679	·28	35.17

(*) Does not include tailings retreated.

(†) A relatively small quantity of gold contained in concentrates, slags, etc., shipped may have originated in ores treated during the previous year; from 1937 represents metal content of total bullion produced plus metal in ores or concentrated shipped to smelters.

(a) Material discarded by sorting not included.

Table 43.—Principal Statistics Relative to All Ontario Gold Mines by Areas,* 1938

Camp or District	Number of producers	Ore treated	Total gold recovered	Average ounces per ton recovered	Employees	Salaries and wages paid	Cost of fuel, electricity and process supplies
		Tons	Fine oz.		No.	\$	\$
Porcupine.....	17	4,789,270	1,258,671	·26	8,222	14,851,682	7,086,736
Kirkland Lake (c).....	17	2,277,424	972,772	·43	5,009	8,974,676	4,449,277
Larder Lake.....	3	349,458	58,057	·17	492	903,176	718,110
Matachewan.....	2	513,675	58,699	·11	442	769,207	567,251
Sudbury.....	4	76,910	21,026	·27	310	531,452	205,064
Algoma.....	7	115,722	16,210	·14	408	678,685	210,494
Thunder Bay.....	13	(a) 559,495	195,895	·35	1,708	2,914,116	1,457,349
Rainy River and Kenora.....	3	(b) 32,516	10,709	·33	206	303,755	138,717
Patricia.....	11	889,458	224,089	·25	1,609	2,773,309	1,605,992
Total.....	77	9,603,923	2,816,123	·29	18,406	32,700,053	16,438,990

(a) In addition 3,100 tons of tailings were treated and some concentrates were not shipped.

(b) In addition 500 tons of tailings were treated.

(c) Probably includes data relating to some non-producing properties that eventually will be classified under Larder Lake area.

*Includes data for all active properties.

Table 44.—Capital Employed in the Auriferous Quartz Mining Industry in Canada, 1938

Province	Mines		Capital employed as represented by:					Total
			Present cash value of the land (excluding minerals)	Present value of buildings, machinery, tools, equipment, etc.	Inventory value of materials on hand, ore in process, fuels, etc.	Inventory value of finished products on hand	Operating capital (cash bills and accounts receivable, prepaid expenses, etc.)	
	Operating	Producing						
			\$	\$	\$	\$	\$	\$
Nova Scotia.....	22	18	552,622	791,332	61,646	26,056	35,302	1,466,958
Quebec.....	169	26	23,282,131	14,315,538	1,604,659	1,607,878	6,216,995	47,027,201
Ontario.....	188	77	49,272,456	73,659,720	6,398,263	2,609,077	35,897,166	167,836,682
Manitoba.....	12	8	2,073,149	2,601,032	472,223	191,813	1,415,473	6,753,690
Saskatchewan.....	6	.....	307,586	171,700	20,500	.....	57,000	556,786
British Columbia.....	137	96	7,740,085	8,231,733	1,298,535	887,873	5,436,270	23,594,496
Northwest Territories†.....	16	1	3,278,059	300,477	151,163	.....	238,290	3,967,989
Total.....	550	226	86,506,088	100,071,532	10,006,989	5,322,697	49,296,496	251,203,802

† Includes 1 mine in Yukon.
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Table 45.—Employees, Salaries and Wages in the Auriferous Quartz Mining Industry in Canada, by Provinces, 1938

Province	Number of employees				Total em- ployees	Salaries and wages
	On salary	Wage-earners				
		Surface	Under- ground	Mill		
						\$
Nova Scotia.....	62	118	274	54	508	507,806
Quebec.....	652	1,761	2,738	320	5,471	8,407,383
Ontario.....	1,410	4,736	11,162	1,220	18,528	32,855,073
Manitoba.....	95	221	367	61	744	1,269,044
Saskatchewan.....	54	96	60	.....	210	358,005
British Columbia.....	395	1,020	2,109	355	3,879	6,494,431
Northwest Territories.....	41	207	54	5	307	570,350
Canada.....	2,709	8,159	16,764	2,015	29,647	50,462,092

Includes 3 employees in Yukon.

Table 46.—Wage-Earners, by Months, in the Auriferous Quartz Mining Industry, 1938

Month	1938			
	Surface	Under-ground	Mill	Total
January.....	7,368	16,239	1,885	25,492
February.....	7,326	16,276	1,878	25,480
March.....	7,430	16,405	1,925	25,760
April.....	7,285	16,372	1,934	25,591
May.....	8,110	16,593	2,004	26,707
June.....	8,456	16,605	2,026	27,087
July.....	8,637	16,518	2,079	27,234
August.....	9,869	16,858	2,097	28,824
September.....	8,793	17,002	2,049	27,844
October.....	8,713	17,277	2,067	28,057
November.....	8,074	17,574	2,139	27,787
December.....	7,500	17,465	2,130	27,095

THE COPPER-GOLD-SILVER MINING INDUSTRY

The mining of "copper-gold-silver" ores in Canada during 1938 was confined to the provinces of Quebec, Manitoba, Saskatchewan and British Columbia. It is to be noted that in addition to the copper recovered from ores of this type there is a very large and increasing quantity of the metal obtained in the smelting and refining of the copper-nickel ores mined in the Sudbury area of Ontario; increasing quantities of gold and silver are also being extracted from these copper-nickel ores. General statistics relating to labour, etc., in the nickel-copper industry are not included in this report.

Mining operations conducted on Canadian copper-gold-silver deposits during 1938 were reported by 37 firms compared with 28 in 1937. The gross value of crude ore, concentrates, etc., shipped in 1938 from the mines and mills to smelters was estimated at \$49,340,183; the cost of fuel, purchased electricity, process supplies, freight and smelter treatment totalled \$20,544,691 and the net value of shipments was estimated at \$28,795,492 compared with \$24,902,851 in the preceding year.

During the year under review the industry provided employment for 5,577 persons and distributed \$8,921,465 in salaries and wages.

The statistics as herein shown under the copper-gold-silver mining industry refer only to mines and mills and are not inclusive of data pertaining to the operation of smelters and refineries. Statistics relating to the reduction of non-ferrous ores are recorded under the non-ferrous smelting and refining industry.

Quebec.—The Horne mine, in Rouyn township, operated by Noranda Mines Ltd., easily remains the "premier" metal mine of the province. It is the third largest producer of gold in Canada, and is also one of the most important producers of copper. Waite-Amulet Mines, Ltd., continued to operate both its mines, the Waite and the Amulet. An aerial tramway was constructed from the Waite to the Amulet mill, which is now treating 450 tons a day of ore from the waite mine. It is estimated by the Company that the New Lower (A) orebody of the Amulet mine contains 3,158,260 tons of ore containing 6.24 per cent copper, 4.65 per cent zinc, 0.05 oz. gold per ton and 1.62 oz. silver per ton. The Aldermac and Normetal mines, and their respective mills, were in continuous operation throughout the year. All the above mines are mining complex sulphide ore bodies, which occur in large lenticular lenses of the replacement type, from which are extracted base metals as well as gold and silver. Moreover the ore from the Horne mine also yields the metals selenium and tellurium.

During 1938, Normetal Mining Corporation Ltd., treated in the mill 110,685 tons of ore assaying 2.452 per cent copper, 8.259 per cent zinc, and .027 and 3.027 oz. per ton gold and silver, respectively; 11,004 tons of copper concentrates were produced, these contained 4,700,192 pounds of copper, 1,998.25 oz. of gold, 231,712 oz. of silver. The production of zinc concentrates totalled 13,312 tons; the zinc content of these amounted to 14,110,428 pounds. All the copper concentrates were shipped to the smelter and of the zinc concentrates produced, 5,966 tons were shipped and the balance placed on stockpile. Early in 1939 operating costs were reported at slightly under \$3.90 per ton.

The tonnage and grade of ore delivered in 1938 from the Horne mine of Noranda Mines Ltd. to the Noranda smelter and concentrator was as follows:—

	Tons	Copper per cent	Gold per ton oz.	Silver per ton oz.
Direct smelting sulphide ore.....	672,778	3.57	0.212	0.63
Concentrating sulphide ore.....	1,106,025	1.51	0.165	0.27
Silicious fluxing ore.....	217,682	0.38	0.069	0.09

During 1938 the smelter treated 1,291,692 tons of ore, concentrate and refinery slag and produced 99,139,734 pounds of anodes. After deducting the copper, gold and silver which was recovered from the slag received from Canadian Copper Refiners Ltd., the estimated production of new metals was 96,966,169 pounds of fine copper, 337,024 ounces of gold, and 975,623 ounces of silver. These figures include the production from 221,498 tons of customs ore and concentrate; the estimated recovery from the Horne mine ores being 76,358,442 pounds of fine copper, 299.033 ounces of gold and 607,447 ounces of silver.

From information obtained in diamond drilling and other openings in the various orebodies, there is now indicated above the 2,975 foot level, as of January 1, 1939, the following tonnage of ore:—

	Tons	Copper per cent	Gold per ton oz.
Sulphide ore over 4 per cent copper.....	7,305,000	7.07	0.149
Sulphide ore under 4 per cent copper.....	18,825,000	0.93	0.192
Silicious fluxing ore.....	3,871,000	1.29	0.136

Manitoba and Saskatchewan.—During 1938 the Hudson Bay Mining and Smelting Co., Limited, mined from both open pit and underground, a total of 1,702,329 tons of ore of which 1,653,123 tons averaging, per ton, copper, 2.03 per cent, zinc, 4.2 per cent, gold, 0.101 ounces, silver, 1.60 ounces, were milled. In addition, 1,248 tons averaging, per ton, copper 0.31 per cent, gold 0.601 ounces, silver 5.90 ounces, were smelted direct. From this tonnage treated and from 138 tons of purchased custom ore and concentrates (assaying 0.681 ounces gold, 0.72 ounces silver and 10.72 per cent copper) there were produced 54,825,936 pounds of copper, 76,827,172 pounds of zinc, 126,107 ounces of gold, 1,835,950 ounces of silver, 188,796 pounds of cadmium, 83,839 pounds of selenium, and 6,119 pounds of tellurium. In addition, the company smelted on toll 57,865 tons of concentrates. Ore reserves of the Flin Flon mine were estimated at the close of 1938 at 27,534,000 tons averaging, per ton, copper 2.23 per cent, zinc 4.20 per cent, gold .094 ounces and silver 1.44 ounces.

Sherritt Gordon Mines Ltd. milled 668,689 tons of ore in 1938 and reported a metal production of 29,022,909 pounds of copper (returnable), 6,262.947 ounces of gold and 212,506.34 ounces of silver. The gross cost of producing a ton of concentrate, including administration

and general (head office) costs, was \$2.228 in 1938 and the net cost of electrolytic copper, f.o.b. refinery, was 7.094 cents per pound. The calculated total ore reserve as at December 31, 1938, was 4,829,500 tons containing 2.45 per cent copper, 2.97 per cent zinc, and 0.018 ounces gold and 0.58 ounces silver per ton. A total of 1,743,169 tons of ore was found during the year which resulted in a net increase in the ore reserve of 1,074,500 tons or approximately 34,910,000 pounds of copper.

British Columbia.—The Granby Consolidated Mining, Smelting and Power Company operated the Copper Mountain mine at capacity. A total of 1,223,200 tons of ore was mined, from which 29,652,613 pounds of copper, 8,730 ounces of gold and 214,676 ounces of silver were produced.

In the Phoenix area concentrates from 17,459 tons of ore from the Brooklyn, Athelstan and Granby mines were shipped to the smelter at Tacoma.

From the Rossland properties of the Consolidated Mining and Smelting Company of Canada, Ltd., 9,633 tons of ore were shipped to Trail, yielding 6,807 ounces of gold, and 7,994 ounces of silver.

The Britannia Mining and Smelting Co. Ltd., operated at capacity during 1938, mined 2,206,992 tons of ore, and produced 33,337,978 pounds of copper, 12,449 ounces of gold and 161,912 ounces of silver. In addition, 74,951 tons of pyrite were produced. The new ore disclosure in the upper levels, containing somewhat higher than normal gold values, was completely developed during 1938 and production from this section of the property began before the close of the year. To keep pace with recent developments in fine grinding and flotation in the metallurgy of ores, and also to allow greater flexibility in capacity, the Britannia mill erected in 1923 was modernized during the year.

Table 47.—Capital Employed in the Copper-Gold-Silver Mining Industry in Canada, 1938

Province	Mines		Capital employed as represented by: (a)					Total
	Operating	Producing	Present cash value of the land (excluding minerals)	Present value of buildings, machinery, tools, equipment, etc.	Inventory value of materials on hand, ore in process, fuels, etc.	Inventory value of finished products on hand	Operating capital (cash bills and accounts receivable, prepaid expenses, etc.)	
Quebec.....	20	6	\$ 4,363,565	\$ 7,237,197	\$ 519,811	\$ 985,923	\$ 5,241,671	\$ 18,348,167
Ontario.....								
Manitoba.....	5	3	7,010,400	13,068,724	973,499	772,929	13,312,095	35,137,647
Saskatchewan....								
British Columbia.	14	*9	2,397,833	4,273,188	581,256	246,568	4,432,070	11,930,915
Total.....	39	18	13,771,798	24,579,109	2,074,566	2,005,420	22,985,836	65,416,729

* Small leasers shipping from deposits of the Cons. M. & S. Co. of Can. Ltd., in the Rossland district, are compiled as 1 producer; statistics relating to employment, etc., at these properties are not available.

(a) Not including smelters and refineries.

Table 48.—Employees, Salaries and Wages in the Copper-Gold-Silver Mining Industry in Canada, by Provinces, 1938*

Province	Number of employees					Salaries and wages
	On salary	Wage-earners			Total employees	
		Surface	Under ground	Mill		
Quebec.....	91	400	1,341	230	2,062	\$ 3,226,896
Ontario.....	178	560	640	170	1,548	2,863,249
Manitoba.....						
Saskatchewan.....						
British Columbia.....	164	583	910	310	1,967	2,831,320
Canada.....	433	1,543	2,891	710	5,577	8,921,465

(*) Not including smelters and refineries.

Table 49.—Wage-Earners, by Months, in the Copper-Gold-Silver Mining Industry in Canada, 1938*

Month	1938			
	Surface	Under-ground	Mill	Total
January.....	1,459	2,748	689	4,896
February.....	1,470	2,732	669	4,871
March.....	1,451	2,777	710	4,938
April.....	1,493	2,789	731	5,013
May.....	1,495	2,795	719	5,009
June.....	1,552	2,857	705	5,114
July.....	1,586	2,881	719	5,186
August.....	1,608	2,966	735	5,309
September.....	1,643	3,038	732	5,413
October.....	1,587	3,052	718	5,357
November.....	1,592	3,053	718	5,363
December.....	1,588	2,987	685	5,260
Average.....	1,543	2,891	710	5,144

(* Smelter employees not included.

Table 50.—Shipments from Copper-Gold-Silver Mines of Canada, 1938

—	Quantity	Value	Total Metal Content as determined by settlement assay				
			Gold	Silver	Copper	Sulphur	Zinc
	tons	\$	fine oz.	fine oz.	pounds	tons	pounds
9 mines shipped to Canadian plants—							
Ores.....	924,236	11,608,275	167,179	470,745	55,558,860		
†Copper concentrates.....	606,255	24,544,997	271,099	2,565,893	138,288,971		1,668,410
Zinc concentrates.....	94,994	3,083,527	8,199	175,391	1,446,591		85,882,822
Iron pyrites concentrates.....	2,088	7,583				1,011	
Slags, residues and gold precipitates.....	234	912,815	23,916	129,478	202,519		
11 mines shipped to foreign plants—							
Ores.....	850	17,845	479	3,191	80,245		
Copper concentrates.....	152,955	8,827,445	23,759	476,207	79,978,954		
Zinc concentrates.....	5,966	202,155	103	12,577	133,526		6,270,471
Iron pyrites concentrates.....	42,515	135,541				21,316	
Total (b).....	1,830,093	49,340,183	494,734	3,833,482	275,689,666	22,327	93,821,703
Value of process supplies, etc. (a).....		20,544,691					
Net Value.....		28,795,492					

† Includes some cyanide precipitate and slags.

(a) Includes freight on ore shipments, smelter charges and fuel and purchased electricity.

(b) Gross value.

Table 51.—Ore Mined and Milled in the Copper-Gold-Silver Mining Industry, in Canada, 1938

	Manitoba and Saskatchewan	Quebec	British Columbia	Canada
	tons	tons	tons	tons
Ore mined.....	1,766,736	2,704,547	3,458,151	7,929,434
Ore milled.....	1,717,530	1,793,273	3,450,385	6,961,188
Copper concentrates produced.....	392,242	246,821	117,002	756,065
Copper precipitates produced.....			723	723
Pyrite concentrates produced.....		98,493	74,951	173,444
Zinc concentrates produced.....	95,000	28,887		123,887

NOTE.—In addition some cyanide precipitate is produced in the recovery of gold from copper-gold ores; this is smelted in the production of blister or anode copper.

CHAPTER III

THE SILVER MINING INDUSTRY IN CANADA

(a) The Silver-Cobalt Mining Industry; (b) The Silver-Lead-Zinc Mining Industry.

Definition of the Industry.—Silver mining in Canada is not a distinct mining industry in as much as silver or silver-bearing minerals usually occur in association with other metals of economic value—with lead and zinc; with cobalt, nickel and arsenic; with lode and placer free gold; in copper-gold and nickel-copper ores, and at Great Bear Lake, N.W.T., with uranium and radium. Silver-lead-zinc mining is a very important industry in British Columbia and, to a lesser extent, in the Yukon Territory. In Eastern Canada ores containing lead and zinc have been mined in Ontario, Quebec and Nova Scotia.

It is to be noted that, in addition to its recovery from silver-lead ores, zinc is now produced in large quantities from the copper-gold-silver ores of the Flin Flon mine, a property located on the Manitoba-Saskatchewan boundary. Zinc concentrates are also produced in British Columbia from copper-gold-silver ores by the Britannia Mining and Smelting Co. Ltd.; the metal also occurs with copper-gold-silver ores in Quebec and commercial shipments of zinc concentrates made from these particular ores were reported in both 1937 and 1938.

Statistical data contained in this report are essentially those pertaining to the mining of silver-cobalt and silver-lead-zinc ores and, to a lesser extent, silver-pitchblende ores.

(a) The Silver-Cobalt Mining Industry

The mining of silver-cobalt ores in Canada is confined to the district of Temiskaming in Northern Ontario. Veins containing these metals were discovered at or near the present town of Cobalt in 1903 and shipments of ores from this area have been continuous since 1904. Depletion and exhaustion of ore reserves during recent years have resulted in a relatively great decline in the production of metals from these deposits. During the past few years the greater part of the output of silver-cobalt ores in Northern Ontario has originated in the Miller-Lake O'Brien mine, Gowganda, and the O'Brien mine, Cobalt. In most instances, operations at other properties, some of which were prominent as producers in the past, were conducted by lessees and shipments ranged from one to several hundred tons. The increased demand for cobalt as an alloying metal has, for some years, stimulated operations of a salvage nature at several of the older mines.

The Ontario Department of Mines reported in July, 1939 that an active search was being maintained in the Cobalt district for cobalt and that many individual operators were steadily producing cobalt ore from their own mines, or under lease, or on a royalty basis. The new customs plant of Cobalt Products Limited which commenced milling in 1938 continued operations throughout the first half of 1939 treating ores and hand-picked material from old ore dumps.

The estimated net value of shipments made by operators comprising the silver-cobalt mining industry amounted to \$288,293 in 1938. The number of shippers totalled 34, employees numbered 297 and salaries and wages paid aggregated \$386,851. Ore mined during the year totalled 59,408 short tons of which 55,719 tons were milled for the production of 1,258 short tons of concentrates. The gross value of ore, concentrates, etc., sold before deducting costs for smelting, fuel and electricity, process supplies and freight, was estimated at \$734,363 compared with a corresponding value of \$853,386 in 1937.

Table 52.—Statistics of the Silver-Cobalt Mines and Mill Operations in Canada, 1936, 1937 and 1938

	1936	1937	1938
Number of mines in operation (x).....	25	25	30
Ore mined.....tons	59,592	56,878	59,408
Ore treated (milled) (a).....tons	62,087	61,290	55,719
Tailings treated.....tons	421		
Concentrates produced.....tons	1,556	1,435	1,258
Gross value of bullion, ore, concentrates and residues sold.....\$	(c) 1,096,968	853,386	734,363
Cost of freight.....\$	(b)	29,202 (d)	41,391
Smelter charges.....\$	(b)	76,833 (d)	82,783
Cost of fuel and purchased electricity used.....\$	104,372	90,134 (d)	78,549
Cost of process supplies used.....\$	77,220	116,455 (d)	248,347
Net value of sales.....\$	915,376	540,762	288,293

(x) All mines located in Northern Ontario and includes properties on which the operations consisted only in salvaging of ore from dumps, etc.

(a) Does not include crude ore shipped.

(b) Information not available.

(c) Less freight and treatment.

(d) Partly estimated as data were unobtainable from several small shippers.

In 1926 there were 336,066 short tons of silver-cobalt ore mined and 326,510 tons treated and the net value of mine sales was \$1,924,693.

Table 53.—Capital Employed in the Silver-Cobalt Mining Industry in Canada, 1926 and 1938

	1938	1926
Capital employed as represented by:—	\$	\$
(a) Present cash value of the land (excluding minerals).....	11,101	
(b) Present value of buildings, fixtures, machinery, tools and other equipment.....	413,275	31,412,576
(c) Inventory value of materials on hand, ore in process, fuel and miscellaneous supplies on hand.....	92,250	
(d) Inventory value of finished products on hand.....	5,734	998,390
(e) Operating capital (cash, bills and accounts, receivable, prepaid expenses, etc.).....	2,173,857	8,093,755
Total.....	2,696,217	40,504,721

Table 54.—Employees, Salaries and Wages in the Silver-Cobalt Mining Industry in Canada, 1926 and 1938

	1926		1938	
	Number	Salaries and wages	Number	Salaries and wages
SALARIED EMPLOYEES—		\$		\$
Total.....	156	400,403	35	59,304
WAGE-EARNERS—				
Surface.....	428	2,415,527	87	327,547
Underground.....	943		131	
Mill.....	252		44	
Total.....	1,623		262	
Grand Total.....	1,779	2,815,930	297	386,851

Table 55.—Number of Wage-Earners on Payroll or Time Record on the 15th of Each Month, or Nearest Representative Date, in the Silver-Cobalt Mining Industry, 1926 and 1938

Month	1926	1938		Total 1938	
		Mine			Mill
		Surface	Under- ground		
January.....	1,496	70	127	36	233
February.....	1,456	75	128	35	238
March.....	1,501	73	127	35	235
April.....	1,478	64	123	40	227
May.....	1,480	70	128	45	252
June.....	1,490	90	129	45	264
July.....	1,501	108	126	44	278
August.....	1,533	111	127	46	284
September.....	1,592	105	134	50	289
October.....	1,560	93	144	58	295
November.....	1,478	94	143	45	282
December.....	1,426	87	136	49	272

(b) The Silver-Lead-Zinc Mining Industry

In 1938 the silver-lead-zinc mining industry of Canada reported 107 operators or firms as being actively engaged in the mining, prospecting or development of silver-lead-zinc deposit and of these operators 95 reported commercial shipments during the year under review.

In the province of Quebec considerable prospecting was conducted by two companies operating in Lemieux township, county of Gaspé, at Montauban les Mines work of an exploratory nature was carried on at the Tetrault mine while in the township of Grand Calumet, Pontiac county, the Calumet Mines Limited were actively engaged in an extensive diamond drilling program.

Only one firm, Lennox Mines Company Ltd., reported work on lead-bearing deposits in Ontario during 1938; operations by this company were conducted at the Lennox mine located in the township of Sheffield, county of Lennox and Addington and no shipments of ores were made.

The tonnage of silver-lead-zinc ores mined in British Columbia in 1938 totalled 2,298,036 short tons or 96 per cent of the total quantity of such ores mined in the entire Dominion. The gross value of shipments of these ores in the province amounted to \$21,675,526 in 1938 and the net value of same was estimated at \$18,031,275. In the south-eastern district the producers of base metals were generally inactive owing to the depressed market; the only notable exception being the Sullivan mine, which maintained production at its established rate. In the Slocan, leasers have found it possible to mine small segments of ore which may be cheaply developed or which have been developed by previous operators, but the only program of new development has been on the Sunshine Group at Sardon, by the Silver Ridge Mining Company. In the South-central district development by the Sally Mines Ltd. in the Beaverdell Camp was reported disappointing by the British Columbia Department of Mines, however, Highland Bell Ltd., has shown that its ore is not limited by depth; Beaverdell-Wellington syndicate investigated ore possibilities on the Bounty, Duncan and other claims. A bulk test-sample of cobbled ore was shipped in 1938 from the Blue Ribbon claim in the Stewart area of the North-western district; this assayed in part, gold 0.02 oz. per ton; silver 87 oz. per ton; copper 0.4 per cent; lead 6.8 per cent; zinc 19.5 per cent; arsenic 1 per cent and antimony 0.1 per cent and the British Columbia Department of Mines reports that the occurrence of high-grade silver-lead-zinc ores on this property exemplifies the requirements for profitable selective mining and shipping to smelters of different types of ores from outlying properties confronted with high transportation costs. The annual report of the Consolidated Mining and Smelting Company of Canada Ltd., states: "The tonnage mined at the Sullivan mine in 1938 was 2,277,915 against 2,218,364 tons in 1937; in spite of the increased filling operations, mining costs in 1938 were 3.8 per cent lower than in the preceding year. The ore concentrated in 1938 was 6,227 tons per calendar day against 6,081 in 1937; the ore milled contained 15.83 per cent of combined lead and zinc, and 4.02 oz. of silver; in the near future mining operations will be started in the block of ore below the 3,900 level; this large block of ore can be considered as a mine in itself. During 1938 the company produced in its metallurgical plants at Trail, B.C., lead 201,574 tons; zinc 149,071 tons; copper 850 tons; gold 56,951 ounces; silver 9,815,434 ounces; cadmium 255 tons; sulphuric acid 134,469 tons and sulphur and fertilizer 170,108 tons."

Silver-lead-zinc ores were mined and milled in Yukon Territories during 1938 by the Treadwell Yukon Corporation Ltd. The Wernecke mines of this company are located at Galena Hill and Keno Hill in the Mayo Mining district and the ores and concentrates produced are shipped to the Bunker Hill smelter, Bradley, Idaho, U.S.A. In addition to shipments made from Wernecke mines there was a relatively small tonnage of silver-lead ores shipped from the same area by small operators.

Eldorado Gold Mines Ltd., reported that 22,770.2 tons of pitchblende-silver ore was treated during 1938 in its mill located at Port Radium at Great Bear Lake, Northwest Territories. From this was sorted 1,754.8 tons of waste and 40.2 tons of high grade pitchblende, silver and cobalt. The mill operated constantly with the exception of minor delays; concentrate production was as follows: Pitchblende-silver 643.0 tons; silver-copper 74.7 tons; cobbled pitchblende-silver 26.0 tons and cobbled cobalt 14.0 tons. The company stated that these various

concentrates were valued at \$1,546,005 in radium, uranium and silver content; in 1938 the company shipped 689 tons of pitchblende and silver concentrates valued at \$1,560,824 to its refinery located at Port Hope, Ont. and 104 tons of copper-silver concentrates valued at \$32,649 to the Tacoma smelter, Washington, U.S.A. In addition to shipments made by the Eldorado Company there was a relatively smaller tonnage of silver bearing ore mined and shipped from the same district by Bear Exploration and Radium Ltd. Shipments made by this company were consigned to Port Hope, Ontario and to Trail, British Columbia.

Table 56.—Ore Mined and Milled in the Silver-Lead-Zinc Mining Industry* in Canada, 1938

	Yukon and Northwest Territories	British Columbia	Canada
	Tons	Tons	Tons
Ore mined.....	89,131	2,298,036	2,387,167
Ore milled.....	88,123	2,275,900	2,364,023
Concentrates produced—Lead.....		281,009	281,009
Zinc.....		233,071	233,071
Pitchblende-silver.....	714		714
Silver and silver-copper.....	94		94

(*) Includes silver-pitchblende ores mined in the Northwest Territories.

Table 57.—Destination of Shipments from Silver-Lead-Zinc Mines of Canada, 1938

	Tons Shipped	Value at shipping point	Total metal content as determined by settlement assay			
			Gold fine oz.	Silver fine oz.	Lead pounds	Zinc pounds
To Canadian smelters—						
Lead ore.....	7,623	461,244	949	1,009,476	1,021,261	249,154
Lead concentrates (a).....	286,434	14,274,927	7,736	7,977,803	396,263,652	20,240,107
Zinc concentrates (x).....	248,914	6,629,894	10	564,126	18,063,258	249,609,553
Dry ore.....	2,339	53,253	68	115,987	80,257	
Silver concentrates (b).....	19	35,990		92,614		
Total.....	545,329	21,455,308	8,763	9,760,006	415,428,428	270,098,814
To Foreign smelters—						
Lead ore.....	2,703	277,286	171	758,979	2,478,084	
Lead concentrates.....	5,410	756,899	894	2,113,846	2,887,602	
Silver concentrates (b).....	165	46,162	6	92,437	3,735	
Zinc concentrates (x).....	35,642	1,009,764		70,554	2,087,043	37,563,748
Dry ore.....	21	6,779	4	15,442	1,026	
Total.....	43,941	2,096,890	1,075	3,051,258	7,407,490	37,563,748
Grand Total (gross).....	589,270	23,552,198	9,838	12,811,264	422,835,918	307,662,562
Cost of freight.....		1,781,756				
Cost of fuel and purchased electricity.....		702,571				
Smelter charges.....		889,805				
Cost of process supplies.....		1,694,121				
Net Value.....		18,483,945				

(x) Does not include any zinc concentrates produced from copper-gold-zinc ores in Quebec, Manitoba, Saskatchewan or British Columbia.

(a) Includes shipments of silver-pitchblende concentrates from Northwest Territories. Information relating to radium content of pitchblende is not available for publication.

(b) Recovered from pitchblende-silver ores; 1937 shipments in transit are credited to 1938. In 1938 these concentrates shipped to Foreign smelters contained 77,217 lb. copper.

NOTE.—In addition to the metals contained in shipments listed in Table 57, there are important quantities of lead and silver contained in ores shipped from certain gold mines in British Columbia. Cadmium, bismuth, antimony and sulphur are also recovered from these ores (silver-lead-zinc).

Table 58.—Capital Employed in the Silver-Lead-Zinc Industry Mining in Canada, 1938

Province	Present cash value of land excluding minerals	Present value of buildings, fixtures, machinery, tools and other equipment	Inventory value of materials on hand, ore in process, fuel and miscellaneous supplies on hand	Inventory value of finished products on hand	Operating capital (cash, bills and accounts receivable, prepaid expenses, etc.)	Total
1938	\$	\$	\$	\$	\$	\$
Ontario, Quebec, Yukon and N.W.T.*.....	443,514	824,704	2,136,733	483,757	437,043	4,325,751
British Columbia.....	14,473,699	9,880,939	1,369,688	2,358	334,279	26,060,963
Canada.....	14,917,213	10,705,643	3,506,421	486,115	771,322	30,386,714

*Includes data relating to silver and silver-pitchblende ores mines in the Northwest Territories.

Table 59.—Employees, Salaries and Wages in the Silver-Lead-Zinc Mining Industry in Canada, 1938

Province	On salary	Mine		Mill	Total	Salaries and wages
		Surface	Under-ground			
British Columbia.....	188	265	607	242	1,302	2,244,388
Ontario, Quebec, Yukon, and N.W.T.†.....	49	104	157	28	338	789,527
Canada.....	237	369	764	270	1,640	3,027,915

† Includes data on silver-pitchblende mining operations in the Northwest Territories.

Table 60.—Number of Wage-Earners, by Months, in the Silver-Lead-Zinc Mining Industry, 1938

Month	1938			
	Mine		Mill	Total 1938
	Surface	Under-ground		
January.....	384	784	291	1,459
February.....	356	778	288	1,422
March.....	354	763	286	1,403
April.....	335	755	282	1,372
May.....	355	731	275	1,361
June.....	379	754	278	1,411
July.....	404	767	255	1,426
August.....	398	741	260	1,399
September.....	379	755	259	1,393
October.....	362	765	250	1,377
November.....	327	777	253	1,357
December.....	323	788	255	1,366
Average.....	369	764	270	1,403

ARSENIC

During recent years arsenic has been produced commercially, only by the Deloro Smelting and Refining Company Limited, in its plant located at Deloro, Ontario. It is recovered by this company entirely in the treatment of silver-Cobalt ores mined in Northern Ontario. Production figures as published represent the element in the form of arsenious acid or white arsenic.

Commercial production of new arsenic in all forms from Canadian ores since 1885 to the end of 1938 amounted to 66,422 short tons valued at \$6,476,604. The largest annual output occurred in 1918 in which year 3,560 short tons worth \$563,639 was recorded. Arsenic is often a constituent of gold ores and has been commercially recovered from auriferous ores mined in Nova Scotia, Ontario and British Columbia. Arsenical gold ores are now being treated at mines located in Northwestern Quebec and Ontario; some of the arsenic recovered from these ores is being stored at the present time.

Table 61.—Production in Canada, Imports and Exports of Arsenic, 1937 and 1938

	1937		1938	
	Quantity	Value	Quantity	Value
	Pounds	\$	Pounds	\$
PRODUCTION (x)—(Sales)				
White arsenic and arsenic in other forms	1,389,426	41,032	2,175,646	56,538
Total.....	1,389,426	41,032	2,175,646	56,538
IMPORTS—				
White arsenic (arsenious oxide).....	7,604	462	201,009	3,854
Sulphide of arsenic.....	24,647	3,377	6,094	408
Soda, arseniate of, biarseniate and stannate of.....	18,510	5,908	11,200	2,843
Arsenate of lead.....	237,992	19,565	496,387	41,620
Arsenate of lime.....	71,168	4,305	37,068	3,507
Total.....		33,617		52,232
Exports—Arsenic—Total.....	735,000	26,938	1,378,300	32,590

*Entirely from Ontario.

Table 62.—Production of Arsenic in Canada, 1929-1938

Year	Arsenic in ore		White arsenic		Year	Arsenic in ore		White arsenic	
	tons	\$	tons	\$		tons	\$	tons	\$
1929.....	766	17,314	1,849	154,006	1934.....			824	56,412
1930.....	1,011	34,523	1,250	95,004	1935.....			1,279	75,326
1931.....			1,787	135,170	1936.....			683	42,491
1932.....			1,212	98,714	1937.....			695	41,032
1933.....			734	56,534	1938.....			1,087	56,538

Table 63.—World Production of Arsenic, 1936-1938

(Long tons)
(Supplied by Imperial Institute)

Producing Country and Description	1936	1937	1938
BRITISH EMPIRE			
United Kingdom—			
White arsenic and arsenic soot.....	153	95	65
Southern Rhodesia—			
White arsenic.....			19
Canada (sales)—			
White arsenic.....	610	620	971
Australia—			
White arsenic.....	3,691	3,387	3,999
FOREIGN COUNTRIES			
Belgium (exports)—			
White arsenic.....	2,688	2,991	2,664
Czecho-Slovakia—			
Antimony ore (As. content).....	53	30	(a)
France—			
Ore (As. content).....	9,490	3,909	(a)
White arsenic (As. content).....	7,104	(a)	(a)
Germany—			
Ore (As. content).....	1,843	(a)	(a)
Greece—			
White arsenic.....	84	230	(a)
Pyrites (As. content).....	770	750	(a)
Italy—			
Ore.....	148	17,826	17,976
White arsenic.....			797
Portugal—			
Pyrites (As. content).....	74		
White arsenic.....	148	21	1
Roumania—			
Pyrites (As. content).....	30	32	33
Sweden—			
Ore (As. content).....	22,944	20,623	21,141
White arsenic.....	8,510	(a)	(a)
Mexico—			
White arsenic.....	8,392	10,592	8,754
United States—			
White arsenic.....	13,731	15,013	14,897
Brazil—			
White arsenic.....	720	705	512
Japan—			
White arsenic.....	2,587	(a)	(a)
Korea—			
White arsenic.....	226	(a)	(a)
Turkey—			
Ore.....	16	27	25

White arsenic is also produced in Germany, U.S.S.R., and China.

(a) Information not available.

COBALT

The Canadian output of cobalt comes entirely from the silver-cobalt deposits of northern Ontario and includes cobalt recovered and sold in the metallic state, the cobalt content of oxides and salts made and sold and the metal content of cobaltiferous ores exported.

There is at present only one smelter in Canada treating cobalt ores; this is the plant of the Deloro Smelting and Refining Company, Limited, located at Deloro, Ontario. This company produced mixed nickel and cobalt oxides at Deloro for the first time in 1910. Continuous operations were conducted by the company throughout 1938 and production included cobalt metal, cobalt salts, cobalt oxide, arsenic and silver bullion. Ores and concentrates treated at the Deloro smelter in 1938 came entirely from the silver-cobalt mines of Northern Ontario.

The following information is from the 1938 Minerals Yearbook of the United States Bureau of Mines. "Increasing world production, assurance of adequate supplies, and extensive research investigations have been important factors in expanding the use of cobalt. Cobalt oxide is used in the ceramic industries and as a catalyst; cobalt salts in the preparation of driers for use in paints, varnishes and linoleums; and cobalt metal in various types of high-grade steels (especially metal-cutting and magnet steels), as a catalyst, and in electroplating processes.

"The Belgian Congo is one of the largest sources of cobalt, but accurate details of production are not available. The copper ores that contain cobalt are divided into two classes. One type, containing about 4 per cent cobalt and 18 per cent copper and iron, is treated in a water-jacketed furnace and an electric furnace to give a ternary alloy containing 30 per cent cobalt and 40 per cent iron, and 26 per cent copper. The other class of ore is rich in cobalt and is sent directly to the electric furnace to obtain the same type of product. Production of cobalt by the Union Minière du Haut Katanga was 1,500 metric tons in 1937; the cobalt-producing capacity of Union Minière du Haut Katanga has been increased considerably by the discovery of further reserves of rich cobalt minerals.

"Cobalt production of Burma is derived largely as a by-product of lead-zinc mining at the Bawdurin Mines of the Burma Corporation Limited. A nickel speiss obtained at the lead smelter contains about 7 per cent cobalt; it is shipped to Hamburg for treatment. A small production of cobalt was reported in Chile in 1938. Finland became a producer of cobalt recently, but figures on output are lacking; in the Outokumpu Copper mine in eastern Finland, approximately 0.2 per cent cobalt, 0.1 per cent nickel, and 26 per cent iron are associated with a 4 per cent copper ore. Output of Cobalt in Germany will be increased by the resumption of operations at an old mine at Schneeberg, Saxony, as well as by exploitation of cobalt deposits in Wittichen and in the Southern Black Forest. In recent years Germany's production of cobalt, amounting to about 17 metric tons annually was obtained as a by-product of the Mansfeld copper shale deposits in Central Germany, but with the now developing exploitation of these cobalt deposits, output will suffice to supply the great bulk of Germany's requirements of around 100 metric tons a year. ... Since 1932 cobalt production in French Morocco has advanced steadily and reached a peak at 719 metric tons in 1938. The Rhokana Corporation Limited of Northern Rhodesia sold 831 short tons of cobalt in alloys and refined products during the year ended June 30, 1938; production increased to 1,461 metric tons in the Calendar Year 1938 compared with 884 tons in 1937; the company installed a third electric furnace in the cobalt plant and a plant for the differential flotation of copper and cobalt to obtain a rich cobalt concentrate was also installed.

"The United States, a large consumer of cobalt, has thus far failed to develop substantial supplies, but recent developments raise the hope that the United States may yet produce cobalt in commercial quantities; experiments on recovery of cobalt from the iron ores mined at Cornwall, Pa., were carried on during 1938; Cobalt, which has been long known to occur as a minor constituent of these iron ores, has been found in increased amounts in the ore bodies now being mined.

"Despite the decreased demand in the United States, domestic quotations were unchanged—97 to 99 per cent metal from Belgium in lots of 100 pounds or more was \$1.36 a pound and black oxide (70 to 71 per cent grade) in lots of 350 pounds or more, \$1.67 a pound."

Table 64.—Production of Cobalt in Canada, 1929-1938

Year	Pounds	Year	Pounds
1929.....	929,415	1934.....	594,671
1930.....	694,163	1935.....	681,419
1931.....	521,051	1936.....	887,591
1932.....	490,631	1937.....	507,064
1933.....	466,702	1938.....	459,226

Table 65.—Production in Canada, Imports and Exports of Cobalt, 1937 and 1938

	1937		1938	
	Quantity	Value	Quantity	Value
	Pounds	\$	Pounds	\$
PRODUCTION (In terms of metallic cobalt and cobalt in oxides and salts sold, and on ores and residues exported).....	507,064	848,145	459,226	790,913
IMPORTS—				
Cobalt ore.....	300	5	.....	9
Oxide of cobalt.....	617	871	736	1,094
EXPORTS—				
Cobalt, contained in ore.....	92,400	58,712	66,400	40,983
Cobalt, metallic.....	7,576	10,834	83,579	122,101
Cobalt, alloys.....	51,939	84,629	49,674	79,278
Cobalt oxides and cobalt salts.....	597,869	754,965	382,408	523,218

Production of cobalt in Canada during the first six months of 1939 totalled 307,542 pounds valued at \$550,125, compared with 219,515 pounds worth \$288,662 in the corresponding period of 1938.

Table 66.—Cobalt Salts used in the Manufacture of Canadian Pigments and Paints, 1932-1938

Year	Pounds	\$	Year	Pounds	\$
1932.....	17,021	10,960	1936.....	170,932	43,230
1933.....	10,885	7,463	1937.....	37,258	17,062
1934.....	26,300	14,069	1938.....	43,703	17,993
1935.....	110,419	33,292			

The Deloro Smelting and Refining Co. Ltd., is the only Canadian firm producing cobalt alloys or cobalt metal; cobalt alloys are sold by this company almost entirely for use as cutting tools and hard facing material.

Table 67.—World Production of Cobalt, 1937-1938

(Supplied by the Imperial Institute)

Producing Country	1937	1938
	Cwt.	Cwt.
BRITISH EMPIRE		
Northern Rhodesia.....	17,409	28,762
Canada (c).....	4,527	4,100
Burma (b).....	5,475	4,034
FOREIGN COUNTRIES		
Belgian Congo.....	(d) 30,000	(d) 26,000
French Morocco (estimated).....	10,900	13,500
Mexico.....	.....	17
Bolivia.....	6	(a)

Complex ores containing cobalt are produced in Finland, Germany, Greece, Japan and China, but figures of cobalt content are not available.

(a) Information not available.

(b) Estimated cobalt content of nickel-speiss exported to Hamburg.

(c) Metal recovered from smelter products plus cobalt contained in cobalt ores exported.

(d) Estimated.

SILVER

Of the total silver produced in Canada in 1938 British Columbia contributed 50·35 per cent; Ontario 19·44 per cent; Yukon 12·80 per cent; Manitoba 5·39 per cent; Quebec 5·35 per cent, and the balance originated in order of quantity in Saskatchewan, Northwest Territories, Nova Scotia and Alberta. According to nature of source 45·7 per cent of Canadian silver output in 1938 represented silver in base silver-lead bullion made chiefly from silver-lead zinc ores; 24·6 per cent in blister and anode copper; 20·2 per cent in copper and silver-lead ores, matte, etc., exported; 5·7 per cent in silver-cobalt ores and 3·8 per cent in bullion produced at gold mines.

Handy and Harman, New York, in a review of the silver market for 1938 stated. "The year 1938 indicates clearly the silver market's complete dependence upon the support of the United States Government. In prior years, subsequent to the passage of the Silver Purchase Act of 1934, there developed from time to time sufficient demand from other quarters to carry the price in New York above the Treasury's buying rate; in fact, during 1935, bullish speculation reached such proportions that an excessive advance occurred. But there was no repetition of this situation during 1938; to the contrary, silver showed extreme weakness whenever uncertainty arose as to the continuance of Government purchases, and when the Treasury lowered its buying rate 2 cents at the end of March, the world price dropped accordingly."

CANADIAN COMMODITY EXCHANGE INC.—SILVER MARKET, 1938

(Contributed by Canadian Commodity Exchange Inc., Montreal, Quebec.)

Prices moved in a narrow range on the Silver market of the Canadian Commodity Exchange during 1938 and the volume of trading suffered a sharp contraction. The main price trend was downward, moving from a high of 45·15 cents an ounce for the spot month in January to a low of 40·50 cents bid for the spot month in December. The market enjoyed fair activity in the early months of the year, but interest dwindled in the autumn months. The silver policy of the United States Government continued throughout the year to be the basic influence on the market.

The spread between the high and low prices at which transactions were executed on the Canadian Commodity Exchange was four cents. The high was established in January with a price of 45·15 cents an ounce and the low was reached in March at 41·15 cents an ounce. During May, June, July, August and September prices ranged from 42 cents to somewhat over 43 cents. In the last three months of the year quotations declined.

In London the daily fixed price for spot metal touched a high of 20½ pence an ounce in March. As in Montreal the low of the year was established in the same month when spot was quoted at 18½ pence an ounce. The New York official price, established by Handy & Harman, ranged between a high of 44½ cents an ounce and a low of 43½ cents an ounce. The former prevailed throughout January, February and most of March. On March 28th the price was lowered by one cent and the following day by another cent to 42½ cents. The latter price remained for the balance of the year. The New York official is ¼ of a cent under the U.S. Treasury's buying rate for foreign silver.

The relatively sudden decline in March resulted from the decision by the United States Treasury to discontinue monthly purchases of silver from Mexico (this action followed the oil expropriation decree of President Cardenas on March 18th). The world market dropped at once, as it appeared that Mexico would have to sell its silver elsewhere than in the United States, and later in the month the U.S. Treasury reduced its foreign buying rate from 45 cents to 43 cents. Later on, however, the United States agreed to purchase Mexican silver from private sources.

Temporary weakness occurred in April when the United States revoked the nationalization of silver, and again prior to the Munich agreement in September.

Of importance to the market was President Roosevelt's proclamation on December 31st, 1938, extending the purchase by the United States Government of newly-mined domestic silver to June 30th, 1939. The price remained unchanged at 64·64 cents an ounce.

Table 68.—Production of Silver in Canada, by Provinces and by Sources, 1937 and 1938

	1937		1938	
	Quantity	Value	Quantity	Value
	Fine oz.	\$	Fine oz.	\$
NOVA SCOTIA—				
In gold bullion and in silver-lead-zinc ores exported (†)—Total.....	26,990	12,113	988	430
QUEBEC—				
In anode copper.....	674,971	302,934	971,417	422,343
In gold ores and in copper and silver-lead-zinc ores exported (†)....	233,619	104,850	218,078	94,814
Total.....	908,590	407,784	1,189,495	517,157
ONTARIO—				
In silver bullion made from cobalt ores.....	1,527,149	685,400	1,087,703	472,901
In gold bullion.....	497,850	223,440	521,459	226,715
In blister copper.....	2,316,433	1,039,638	2,437,596	1,059,793
In ores, concentrates, residues, matte, etc., exported or treated in smelters outside the province.....	351,615	157,808	272,079	118,292
Total.....	4,693,047	2,106,286	4,318,837	1,877,701
MANITOBA—				
In blister copper.....	889,750	399,329	1,147,216	498,775
In gold bullion and in ores, slag, etc., exported.....	15,429	6,924	51,099	22,216
Total.....	905,179	406,253	1,198,315	520,991
SASKATCHEWAN—				
In blister copper (a).....	821,637	368,759	898,405	390,600
In gold bullion or in crude alluvial gold.....	181	81	8	3
Total.....	821,818	368,840	898,413	390,603
ALBERTA—				
In alluvial gold—Total.....	4	2	23	10
BRITISH COLUMBIA—				
In alluvial gold.....	9,748	4,375	10,397	4,520
In gold bullion.....	95,443	42,836	110,911	48,221
In base bullion and in ores, matte, etc., exported.....	11,424,986	5,127,648	11,065,255	4,810,841
Total.....	11,530,177	5,174,859	11,186,563	4,863,582
YUKON—				
In alluvial gold.....	10,503	4,714	16,043	6,975
In silver-lead ores shipped to smelter.....	3,946,001	1,771,005	2,828,616	1,229,797
Total.....	3,956,504	1,775,719	2,844,659	1,236,772
NORTHWEST TERRITORIES—				
In pitchblende-silver ores shipped to smelters (x) and in gold bullion—Total.....	135,442	60,788	581,902	252,993
Canada—Total.....	22,977,751	10,312,644	22,219,195	9,660,239

(†) Silver-lead ores exported in 1937 only.

(x) Comprises silver in silver sulphide, etc., made at the Eldorado refinery, Port Hope, Ont., plus silver in ores shipped to other metallurgical plants; in addition to quantity recorded for 1937 there were silver concentrates in transit, the silver content of which is included with output for 1938.

(a) Represents silver contained in blister copper made at the Flin Flon smelter from Saskatchewan ores.

NOTE.—For 1937 silver was valued at 44.881 cents per fine ounce, the average price of the metal on the New York market expressed in Canadian funds; for 1938 the corresponding price was 43.477 cents.

Table 69.—Production of Silver in Canada for 1929-1938

Year	Ounces	Cents per ounce	Year	Ounces	Cents per ounce
1929.....	23,143,261	52-99	1934.....	16,415,282	47-46
1930.....	26,443,823	38-15	1935.....	16,618,558	64-79
1931.....	20,562,247	29-87	1936.....	18,334,487	45-13
1932.....	18,347,907	31-67	1937.....	22,977,751	44-88
1933.....	15,187,950	37-83	1938.....	22,219,195	43-48

Table 70.—Source of Canadian Silver Production, by Percentages, 1937 and 1938

Source	1937	1938
	%	%
In silver-cobalt ores.....	7.9	5.7
In base bullion*.....	41.7	(†) 45.7
In gold ores (bullion and placer).....	7.8	3.8
In blister and anode copper.....	20.5	24.6
In matte, copper ores and silver-lead ores, etc., exported.....	22.1	20.2
	100.0	100.0

(x) Chiefly from silver-lead ores.

(†) Includes silver recovered in Canada from pitchblende-silver ores.

Table 71.—Silver Consumed in Specified Canadian Industries, 1937 and 1938

	1937		1938	
	Fine oz.	Value	Fine oz.	Value
		\$		\$
Scientific equipment (a).....	628,001	296,628	696,437	310,703
Fountain pens and pencils (a).....		480,215	.....	505,038
Jewellery and silverware (fine silver).....		414,474	.....	361,555
Jewellery and silverware (silver alloys).....	45,296	20,699	45,283	20,241
Medicinal and pharmaceutical preparations (bullion).....	17,010	7,654	13,089	5,759
Miscellaneous chemicals.....				

(a) Consumed largely in the manufacture of photographic film.

Table 72.—Imports into Canada and Exports of Silver, 1937 and 1938

	1937		1938	
	Quantity Fine oz.	Value \$	Quantity Fine oz.	Value \$
IMPORTS—				
Silver in bars, etc., unmanufactured.....	1,987,082	870,388	2,011,048	850,488
Silver, manufactures of, n.o.p., and articles consisting wholly or in part of sterling or other silverware.....		362,439	.....	293,193
Toilet articles of which the most important component, in value, is sterling silver.....		60,452	.....	33,216
Total.....		1,293,279	.....	1,176,897
EXPORTS—				
Silver contained in ore, concentrates, etc. (c).....	5,769,332	2,567,412	5,868,827	2,540,860
Silver bullion—Domestic (a).....	14,620,025	6,556,357	22,682,687	9,838,462
Total.....	20,389,357	9,123,769	28,551,514	12,379,322
Silver bullion—Foreign (b).....	670,550	303,753	1,244,096	550,893
Silver coin—Foreign (subsidiary).....		1,353,988	.....	1,500,837
Silver coin—Canadian.....		58,288	.....	32,325

(a) Of the quantity exported, 11,239,967 ounces in 1937 and 21,713,359 ounces in 1938 went to the United States.

(b) Of these exports, 426,617 ounces went to the United States in 1937 and 1,062,078 ounces in 1938.

(c) In 1937, 5,324,684 ounces went to the United States and in 1938, 5,573,016 ounces.

Table 73.—World Production of Silver Ore, 1937-1938

(In terms of metal)

(Supplied by the Imperial Institute)

(Fine troy ounces)

Producing Country	1937	1938	Producing Country	1937	1938
BRITISH EMPIRE			FOREIGN COUNTRIES—(Conc.)		
United Kingdom.....	71,448	107,985	Norway.....	283,249	241,000
Bechuanaland Protectorate.....	1,499	1,127	Poland.....	63,000	61,000
Gold Coast (estimated).....	19,000	23,000	Portugal.....	20,000	16,741
Kenya.....	7,549	11,200	Roumania.....	824,480	502,890
Nigeria.....	102,120	(a)	Sweden.....	946,239	1,123,835
Northern Rhodesia.....	83,861	88,237	U. S. S. R. (estimated).....	6,000,000	7,000,000
Sierra Leone.....	1,568	(a)	Yugoslavia.....	2,242,495	2,450,000
Southern Rhodesia.....	152,038	166,417	Algeria.....	72,177	(a)
South West Africa (d).....	358,500	673,500	Belgian Congo.....	2,961,787	3,120,000
Tanganyika Territory.....	11,696	16,473	Morocco (French).....	241,543	(a)
Uganda (exports).....	1,379	1,981	Mozambique.....	1,474	1,808
Union of South Africa.....	1,100,641	1,135,374	Tunis.....	174,638	61,149
Canada.....	22,977,751	22,219,195	Mexico.....	84,678,921	81,016,939
Newfoundland.....	1,447,637	1,645,590	Porto Rico.....	1	1
British Guiana (estimated).....	4,740	5,060	United States.....	71,408,625	61,705,837
Burma.....	6,180,000	5,920,000	Honduras.....	3,222,824	3,346,246
Cyprus (b).....	132,968	106,524	Nicaragua.....	99,665	158,274
India.....	24,642	22,295	Panama.....	(a)	(a)
Federated Malay States (estimated).....	3,000	3,500	Salvador.....	2,866	14,565
Sarawak.....	.....	1,660	Argentina.....	2,122,000	(a)
Australia.....	14,059,258	15,552,037	Bolivia (exports).....	9,452,000	6,366,000
Fiji.....	3,463	12,380	Brazil.....	25,238	25,591
New Guinea (estimated).....	96,000	104,000	Chile.....	1,786,222	1,414,086
New Zealand.....	443,981	357,709	Colombia.....	167,971	192,879
			Ecuador.....	73,350	81,974
			Guiana (French and Dutch) (estimated).....	6,000	6,000
Total.....	47,300,000	48,300,000	Peru.....	17,453,331	(b)20,424,027
			Venezuela (estimated).....	7,000	7,000
FOREIGN COUNTRIES			China.....	200,000	(a)
Austria.....	3,989	(a)	French Indo-China.....	3,537	2,411
Bulgaria (estimated).....	6,500	13,000	Japan.....	(c)10,000,000	(c)10,000,000
Czecho-Slovakia.....	1,056,552	(a)	Korea.....	2,673,000	(a)
Finland.....	55,137	58,000	Manchuria.....	(a)	(a)
France.....	563,847	(a)	Netherlands East Indies.....	500,084	579,131
Germany.....	6,773,169	(a)	Philippine Islands.....	719,771	1,167,612
Greece.....	1,135,041	(a)			
Hungary.....	79,277	(a)	Total.....	229,000,000	219,000,000
Italy.....	715,000	820,000	World's Total.....	276,000,000	267,000,000

Silver ore is also produced in Spain.

(a) Information not available.

(b) Exports.

(c) Estimated.

(d) Years ended March 31 following.

Table 74.—World's Monetary Stocks of Silver at the Close of 1938

(Supplied by the United States Mint and subject to revision)

(Stated in United States money, 000's omitted)

Country	Silver stock in banks and treasuries (*)	1938	Country	Silver stock in banks and treasuries (*)	1938
		Per capita			Per capita
	\$	\$		\$	\$
United States (including Hawaii, Alaska and Porto Rico) (10)....	5,367,771	41-07	Yugoslavia (3).....	22,143	1-42
Canada (1).....	30,483	2-72	British Malaya.....	15,305	2-54
Mexico (2).....	54,409	2-79	Indo-China—French.....	5,951	0-26
Cuba (3) (3).....	69,394	16-52	Iran (Persia) (4) (5).....	23,548	1-57
Chile (2) (4).....	334	0-07	Palestine.....	5,184	3-61
Colombia.....	11,379	1-32	Syria.....	1,185	0-33
Peru.....	4,646	0-65	Turkey.....		
Venezuela.....	38,139	10-80	British West Africa.....	7,005	0-28
Uruguay (4).....	3,127	1-48	Nyasaland.....	5,345	3-26
Belgium.....	5,791	0-69	Rhodesia, Southern (4).....	801	0-61
France (3).....	79,074	1-88	New Zealand (6).....	8,784	5-48
Germany.....	511,770	6-50	Ceylon.....	9,639	1-67
Bulgaria (2).....	22,875	3-59	China.....		
Czecho-Slovakia.....			India—British (4).....	254,063	0-71
Denmark.....			Morocco.....	1,952	0-27
Hungary.....	2,696	0-27	Japan (including Chosen, Taiwan, Kwantung and Karafuto).....		
Lithuania.....	6,500	2-52	Netherlands East Indies (10).....	51,857	0-77
Great Britain (3).....	280,218	5-90	Philippine Islands (7) (10).....	19,009	1-39
Greece (3).....	2,610	0-37	Thailand (Siam) (10).....	30,492	2-08
Eire (8).....	7,737	1-61	Egypt.....	19,454	1-21
Latvia.....	7,958	4-02	Kenya, Uganda, Tanganyika and Zanzibar (9).....	16,591	1-33
Netherlands.....	90,677	10-39	Sudan—Anglo Egyptian.....	7,380	1-19
Norway.....	1,642	0-56	Union of South Africa.....	16,052	1-62
Poland.....	72,803	2-07	Australia (June 30, 1938).....	38,862	5-61
Rumania (2) (3).....	34,912	1-76	Algeria and Tunis.....	3,156	0-31
Spain.....			Other countries.....	139,182	
Switzerland (3).....	45,274	10-75			
Italy.....					
Portugal.....					
Sweden (4).....	218	0-03			
			Total.....	7,452,377	3-61

(*) Monetary silver stock in government treasuries, in banks, and when data available, in circulation. United States equivalent of reported face value at exchange rates.

- (1) Net issues of silver coin.
- (2) Includes base metal coin.
- (3) Prior year's figures at new equivalents where equivalents other than the legal parity are applicable.
- (4) Silver in circulation not included.
- (5) The Statist, February 23, 1939.
- (6) Australian coins and notes are the circulating media.
- (7) Silver converted to United States equivalent at legal rate.
- (8) Exclusive of British coins and currency which still circulate in the Irish Free State.
- (9) On June 30, 1938.
- (10) Includes silver bullion.

LEAD

Of the total Canadian lead output in 1938 the mines of British Columbia accounted for 113,706,307 pounds or 98.8 per cent; Yukon Territory 5,198,990 pounds or 1.2 per cent while the balance of 22,363 pounds all from Ontario, represented the recovery of the metal, as a by-product, in the treatment of silver-cobalt ores.

World production in 1938 of lead and comprising the lead content of base bullion and refined lead was estimated by the American Bureau of Metal Statistics at 1,879,460 short tons, compared with 1,895,491 short tons in 1937. According to production as thus defined Canada ranked fourth as a world producer of lead in 1938 being surpassed in order of output by the United States, Mexico and Australia.

Canadian production of lead from 1887, the first year for which statistical data are available to the close of 1938 totalled 5,985,551,247 pounds valued at \$277,190,664.

The following information pertaining to lead and zinc is from the 1938 Annual Report of the Consolidated Mining and Smelting Co. of Canada Ltd.,—"1938 was a difficult year in the handling of our principal products, lead and zinc. In comparison with the previous year world production, consumption and prices were lower. Ordinary commercial activity which is the basis of real progress and prosperity, was seriously interfered with by wars, actual and threatened, in Europe and Asia. There was some increase in the demand for our metals in armaments, but not sufficient to offset the loss through the decrease in building activity, and the general decline in world trade caused by the spirit of fear and uncertainty which prevailed.

"In September a large number of the large lead producers of the World, outside the U.S.A., formed the Lead Producers' Association for the purpose of maintaining production more closely in line with consumption, with a view not only to price improvement, but also to prevent, if possible, what is commonly called a "run-away market" in times of metal shortage, such as was experienced in the first half of 1937. On November 1st a reduction in output was agreed upon, and since then the larger producers have been operating at 90 per cent. An association along somewhat similar lines has been widely discussed among zinc producers, but nothing workable has yet been developed."

Table 75.—Production (†) of New Lead in Canada, 1929-1938

Year	Pounds	\$	Price per pound (Canadian funds)
			c.
1929.....	326,522,566	16,544,248	5-054
1930.....	332,894,163	13,102,635	3-927
1931.....	267,342,482	7,260,183	2-710
1932.....	255,947,378	5,409,704	2-114
1933.....	266,475,191	6,372,998	2-392
1934.....	346,275,576	8,436,658	2-346
1935.....	339,105,079	10,624,772	3-133
1936.....	383,180,909	14,993,869	3-913
1937.....	411,999,484	21,053,173	5-110
1938*.....	418,927,660	14,008,941	3-344

Maximum annual value of Canadian lead production was \$23,127,460 in 1925.

(*) Year of maximum output of Canadian lead.

(†) Lead content of base bullion produced plus lead in ores exported.

Table 76.—Refined Lead Production in Canada,* 1928-1938

Year	Pounds of refined lead produced	Year	Pounds of refined lead produced
1928.....	301,067,819	1934.....	†314,457,735
1929.....	304,449,673	1935.....	†327,515,277
1930.....	304,471,706	1936.....	†363,449,490
1931.....	278,448,457	1937.....	†399,394,939
1932.....	253,136,522	1938.....	†400,763,914
1933.....	254,565,861		

* Includes the electrolytic lead produced from Canadian and foreign ores at Trail, B.C.; and also the pig lead from Galetta, Ont., until 1931.

† Primary lead only.

Table 77.—Imports into Canada and Exports of Lead, 1938

	1938	
	Pounds	Value
IMPORTS—		
Old and scrap, pig and block.....	(a) 56,416	3,235
Bars and sheets.....	54,507	2,948
Litharge.....	2,125,900	143,597
Acetate of lead.....	245,949	14,493
Nitrate of lead.....	285,303	16,250
Other manufactures.....		67,228
Pipe lead.....	28,333	1,671
Shots and bullets.....	9,023	634
Tea lead.....		
Lead arsenate.....	496,387	41,620
Lead tetraethyl, compounds of.....	5,486,418	2,485,032
Lead capsules for bottles.....		65,029
Lead pigments—		
Dry white lead.....	91,025	5,592
White lead, ground in oil.....	9,928	916
Dry red lead and orange mineral.....	453,721	31,593
Total.....		2,879,838
EXPORTS—		
Lead, contained in ore, etc.—		
To—United States.....	6,636,300	322,714
Belgium.....	520,600	22,455
Total Lead in Ore.....	7,162,300	345,394
Pig lead, refined lead, etc.—		
To—United Kingdom.....	239,161,900	6,656,476
United States.....	41,500	1,469
Japan.....	34,762,700	957,140
France.....	5,970,400	177,751
China.....	7,469,600	213,628
Brazil.....	7,400,200	205,096
Germany.....	10,000	300
Other countries.....	15,047,800	425,928
Total Pig Lead.....	309,864,100	8,637,797
Total Lead Exports.....	317,026,400	8,983,191

(a) Pig and block only.

Table 78.—Available Statistics on the Consumption of Lead in Specified Canadian Manufacturing Industries, 1937 and 1938

Industries	Item used	1937	1938
		Pounds	Pounds
Brass and copper products.....	{ Pig lead.....	804,379	712,315
	{ Scrap and other lead.....	306,379	466,372
Paints and pigments.....	Pig lead (*).....	14,442,025	13,720,025
White metal alloys.....	{ Pig lead.....	10,818,139	11,875,116
	{ Scrap lead.....	12,082,034	12,230,944
Electrical apparatus.....	{ Pig lead.....	21,054,881	21,467,082
	{ Scrap lead.....	129,400	154,125
	{ Lead sheets, etc.....	798,603	874,760
Iron and steel.....	Lead.....	1,810,495	1,306,444
Explosives.....	Pig lead.....	1,024,749	794,098
Grand Total.....		63,271,084	63,603,281

* Some products such as lead oxides made from pig lead by the paints and pigments industry are sold to other industries for the manufacture of such products as storage batteries.

Table 79.—World Production of Lead Ore, 1937-1938

(In terms of metal)

(Supplied by the Imperial institute)

(Long tons)

Producing Country	1937	1938	Producing Country	1937	1938
BRITISH EMPIRE			FOREIGN COUNTRIES—Con.		
United Kingdom.....	26,395	29,745	Portugal.....	1,289	2
Nigeria.....	554	296	Roumania.....	8,305	(a)
Northern Rhodesia.....	3,890	2,911	Spain (smelter) (c).....	30,000	35,000
Southern Rhodesia.....	24	40	Sweden.....	9,124	8,484
South West Africa (d).....	10,100	17,700	U.S.S.R. (smelter) (c).....	55,000	67,000
Tanganyika.....	32	.....	Yugoslavia.....	70,000	83,000
Union of South Africa.....	102	125	Algeria.....	4,408	4,575
Canada (b).....	183,928	187,021	Belgian Congo.....	4,768	10,061
Newfoundland.....	28,778	31,275	French Equatorial Africa.....	120	1,600
Burma.....	91,200	87,600	Morocco (French).....	15,866	18,700
Federated Malay States.....	.....	.....	Morocco (Spanish).....	192	(a)
Australia.....	246,045	274,384	Tunis.....	12,859	18,848
Total.....	591,000	632,000	Guatemala (estimated).....	50	40
FOREIGN COUNTRIES			Mexico (b).....	214,688	277,909
Austria.....	8,552	(e)	United States (b).....	415,082	330,113
Bulgaria.....	160	335	Argentina.....	18,640	22,000
Czechoslovakia.....	3,841	4,000	Bolivia (exports).....	17,999	12,960
Finland.....	243	85	Chile.....	(a)	(a)
France.....	4,567	4,000	Peru.....	41,374	(f) 57,022
Germany.....	77,652	(e) 94,000	China.....	(a)	(a)
Greece.....	7,134	(a)	French Indo-China.....	.....	.....
Italy.....	34,800	40,000	Japan (smelter).....	(c) 10,000	(c) 12,000
Norway.....	352	(a)	Korea (smelter).....	5,758	(c) 10,000
Poland.....	10,000	10,000	Philippine Islands (estimated).....	15	210
			Turkey.....	7,600	7,100
			Total.....	1,090,000	1,150,000
			World's Total.....	1,680,000	1,780,000

(a) Information not available.

(b) Amount estimated as recoverable.

(c) Estimated.

(d) Years ended March 31 following.

(e) Austria included with Germany.

(f) Exports.

Table 80.—World Metal Production of Lead, 1937 and 1938

(Supplied by the Imperial Institute)

(Long tons)

Producing Country	1937	1938	Producing Country	1937	1938
BRITISH EMPIRE			FOREIGN COUNTRIES—Con.		
United Kingdom.....	10,150	9,800	Norway.....	232	(a)
Northern Rhodesia.....	559	273	Poland.....	17,309	19,667
South-West Africa.....	1,333	3,163	Roumania.....	6,619	5,566
Canada.....	178,301	178,912	Spain (smelter).....	30,000	35,000
Burma.....	77,050	80,200	U.S.S.R. (estimated).....	55,000	65,000
Australia (d).....	228,530	222,583	Yugoslavia.....	3,972	8,483
Total.....	497,000	495,000	Tunis.....	24,307	23,414
FOREIGN COUNTRIES			Mexico.....	198,019	227,269
Austria.....	10,665	9,133	United States.....	416,549	325,738
Belgium (b).....	91,836	(e) 85,000	Argentina.....	11,200	10,500
Czechoslovakia.....	4,983	(e) 5,000	Chile.....	516	(a)
France.....	37,700	42,900	Peru.....	19,703	(f) 28,028
Germany (c).....	170,451	173,200	French Indo-China.....	8	.....
Greece.....	9,118	(a)	Japan.....	(e) 10,000	(e) 12,000
Hungary.....	145	(a)	Korea.....	5,758	(a)
Italy.....	38,857	43,336	Total.....	1,160,000	1,130,000
			World's Total.....	1,660,000	1,620,000

(a) Information not available.

(b) Includes base bullion as follows:—1937—8,405 long tons.

(c) Includes some secondary. Figures as published by Metallgesellschaft, which exclude secondary, are—1937—159,800 long tons.

(d) Includes base bullion as follows:—1936—33,450 long tons
1937—41,773 " " " " " "

1938—40,369 " " " " " "

(e) Estimated.

(f) Exports.

ZINC

Production of new zinc in Canada during 1938 totalled 381,506,588 pounds valued at \$11,723,698 compared with 370,337,589 pounds at \$18,153,949 in 1937. The quantity produced in 1938 was an all time high record but the value was surpassed by that for the preceding year owing to the pronounced decline from an average annual price of 4-90 cents per pound in 1937 to 3-07 cents for the year under review. The production of 299,363,564 pounds of zinc in British Columbia in 1938 represents the recovery of the metal almost entirely in the refined state from silver-lead-zinc ores, chiefly from the Sullivan mine of the Consolidated Mining and Smelting Co. of Canada Ltd., whereas the recorded output of zinc in 1938 for Manitoba, Saskatchewan and Quebec represents the recovery of zinc chiefly in the refined state from copper-gold-silver ores.

World production of zinc (spelter) in 1938, including slab zinc from secondary material, was estimated by the American Bureau of Metal Statistics at 1,751,870 short tons and as thus defined Canada ranked fourth as a World producer being surpassed in order of output by United States, Germany and Belgium; as a world producer of zinc ores, Canada usually ranks second or third.

The total value of Canadian zinc production since the first recording of Canadian zinc statistics in 1898 and inclusive of 1938 totalled \$168,576,418.

Table 81.—Production of Zinc from Canadian Ores, 1929-1938

Year	Pounds	Value
1929.....	197,267,087	10,626,778
1930.....	267,643,505	9,635,166
1931.....	237,245,451	6,059,249
1932.....	172,283,558	4,144,454
1933.....	199,131,984	6,393,132
1934.....	298,579,683	9,087,571
1935.....	320,649,859	9,936,908
1936.....	333,182,736	11,045,007
1937.....	370,337,589	18,153,940
1938.....	381,506,588	11,723,698

Table 82.—Refined New Zinc Produced in Canada, 1931-1938

Year	Price* per pound	Short tons	Year	Price* per pound	Short tons
	cents			cents	
1931.....	2-55	118,622	1935.....	3-10	149,523
1932.....	2-41	86,141	1936.....	3-31	151,103
1933.....	3-21	91,946	1937.....	4-90	158,542
1934.....	3-04	134,917	1938.....	3-07	171,932

* In Canadian funds.

Table 83.—Imports into Canada and Exports of Zinc, 1938

	1938	
	Pounds	Value
IMPORTS—		\$
Zinc dust.....	1,373,900	70,294
Zinc in blocks, pigs, bars and rods and zinc plates, n.o.p.....	5,900	643
Zinc in sheets and strips, and zinc plates for marine boilers.....	6,771,600	467,114
Zinc spelter.....	2,700	201
Zinc slugs or discs for batteries.....		20,582
Zinc white (zinc oxide).....	12,492,235	489,850
Zinc sulphate.....	585,362	8,977
Zinc, chloride of.....	1,252,081	48,720
Zinc, manufactures of, n.o.p.....		206,948
Lithopone.....	17,731,708	632,273
Total.....		1,945,602

Table 83.—Imports into Canada and Exports of Zinc, 1938—Concluded

	1938	
	Pounds	Value
EXPORTS—		\$
Zinc, contained in ore—		
To—Belgium.....	37,116,200	963,944
Japan.....	3,950,100	76,217
United Kingdom.....		
France.....	3,442,200	104,987
United States.....		
Total.....	45,841,000	1,154,812
Zinc, scrap, dross and ashes		
To—United Kingdom.....	554,200	8,567
United States.....	494,700	14,341
Japan.....	56,400	575
Belgium.....	1,056,500	8,977
France.....	50,000	200
Total.....	2,364,100	34,235
Zinc, spelter—		
To—United Kingdom.....	198,778,900	6,563,273
United States.....	4,783,500	161,147
British India.....	1,272,900	47,564
Chile.....	112,000	4,251
Belgium.....	10,586,200	315,717
Brazil.....	532,800	15,000
China.....	2,575,700	76,106
France.....	5,678,500	181,084
Germany.....	3,605,400	146,768
Japan.....	30,194,500	920,758
Mexico.....	197,100	6,170
British South Africa.....	145,300	4,156
Netherlands.....	44,800	1,362
Siam.....		
Sweden.....	2,016,500	56,629
Spain.....	2,240,000	76,384
Denmark.....	448,100	12,759
Hong Kong.....	807,900	24,562
Total.....	264,424,100	8,626,961
Grand Total—Exports.....	312,629,200	9,816,008

Table 84.—Available Statistics on the Consumption of Zinc and Zinc Products in Specified Canadian Manufacturing Industries, 1937 and 1938

Industry	Items used	1937	1938
	METAL	Pounds	Pounds
Brass and copper products.....	Other zinc.....	271,312	286,395
	Zinc ingots and slabs.....	5,938,523	4,540,598
White metal alloys.....	Zinc scrap.....	71,137	47,632
	Zinc spelter.....	2,422,336	2,256,403
Electrical apparatus.....	Zinc scrap.....	951,995	627,551
	Zinc ingots and bars.....	880,619	1,117,940
Acids, alkalies and salts.....	Zinc sheets.....	2,712,989	2,319,830
Iron and steel.....	Zinc metal.....	3,584,568	2,717,080
Miscellaneous chemicals.....	Zinc.....	26,913,053	26,442,237
	Zinc sheet.....	68,947	81,922
Grand Total.....		43,815,479	40,437,588
	PRODUCTS		
Paints and pigments.....	Zinc oxide.....	2,619,194	2,616,269
	Leaded zinc oxides and zinc leads....	3,538,049	3,653,872
Electrical apparatus.....	Lithopone*.....	14,322,160	14,235,197
Toilet preparations.....	Zinc chloride.....	423,498	436,562
	Zinc oxide.....	61,334	41,580
	Zinc stearate.....	25,680	17,435

* A mixture of zinc sulphide and barium sulphate prepared by precipitation.

DOMINION BUREAU OF STATISTICS

Table 85.—World Production of Zinc Ore, 1937 and 1938

(In terms of metal)
(Supplied by Imperial Institute)
(Long tons)

Producing Country	1937	1938	Producing Country	1937	1938
BRITISH EMPIRE			FOREIGN COUNTRIES—con.		
United Kingdom.....	7,588	11,486	Roumania.....	6,184	(a)
Northern Rhodesia.....	18,844	12,498	Spain (estimated).....	20,000	30,000
Canada (shipments) (b).....	183,293	(c) 185,000	Sweden.....	35,433	34,024
Newfoundland.....	63,137	65,891	U.S.S.R. (smelter) (e).....	70,000	70,000
Burma.....	58,600	54,900	Yugoslavia.....	48,000	41,000
Australia.....	203,456	219,779	Algeria.....	8,229	6,860
Total.....	535,000	550,000	Belgian Congo.....	3,009	4,000
FOREIGN COUNTRIES			French Equatorial Africa.....	869	1,600
Austria.....	2,920	(d)	French Morocco.....	4,920	3,000
Bulgaria.....	3,000	300	Tunis.....	1,180	358
Belgium (c).....	1,919	(a)	Mexico.....	152,183	169,498
Czechoslovakia.....	868	389	United States.....	559,252	461,338
Finland.....	891	(a)	Argentina.....	15,405	(a)
France.....	162,918	(e) 200,000	Bolivia (exports).....	11,347	10,537
Greece.....	9,766	(a)	Peru.....	17,975	(f) 14,336
Italy.....	(e) 70,000	(e) 75,000	China (estimated).....	4,000	(a)
Norway.....	8,658	8,000	French Indo-China.....	4,880	5,080
Poland.....	68,000	69,000	Japan (c).....	20,000	22,000
Portugal.....	9	(a)	Korea (ore).....	(a)	(a)
			Turkey.....	10,500	13,400
			Total.....	1,320,000	1,290,000
			World's Total.....	1,860,000	1,840,000

(a) Information not available.

(b) The amount estimated as recoverable was—
1937.....148,742 long tons.
1938.....170,315 “

(c) Metallgesellschaft estimate.

(d) Included with Germany.

(e) Estimated. (f) Exports.

Table 86.—World Metal Production of Zinc, 1937 and 1938

(Supplied by Imperial Institute)
(Long tons)

Producing Country	1937	1938	Producing Country	1937	1938
BRITISH EMPIRE			FOREIGN COUNTRIES—con.		
United Kingdom (b).....	62,000	55,000	Italy.....	37,382	33,103
Northern Rhodesia.....	14,031	10,215	Netherlands.....	24,256	24,900
Canada.....	141,555	153,511	Norway.....	40,624	45,000
Australia.....	69,750	69,820	Poland.....	105,481	106,364
Total.....	287,000	289,000	Spain (e).....	5,200	7,500
FOREIGN COUNTRIES			U.S.S.R. (e).....	70,000	70,000
Belgium.....	214,311	207,000	Yugoslavia.....	4,933	4,566
Czechoslovakia.....	7,220	8,736	Mexico.....	33,558	36,910
France.....	60,000	60,000	United States (c).....	497,236	398,519
Germany.....	161,227	191,300	French Indo-China.....	4,138	4,399
			Japan.....	(e) 45,000	(e) 50,000
			Total.....	1,310,000	1,250,000
			World's Total.....	1,600,000	1,540,000

(b) Includes some secondary.

(c) The production by grades (including redistilled secondary) was as follows (long tons):—

	1937	1938
A—High grade.....	175,046	125,229
B—Intermediate grade.....	59,939	51,900
C & D—Select and brass special.....	65,172	65,825
E—Prime western.....	243,108	183,791

(e) Estimated.

Table 87.—World Production of Electrolytic Zinc, 1937 and 1938

(Supplied by Imperial Institute)
(Long tons)

Producing Country.	1937	1938	Producing Country	1937	1938
BRITISH EMPIRE			FOREIGN COUNTRIES—con.		
Northern Rhodesia.....	10,285	7,126	Germany.....	39,733	(a)
Canada.....	141,555	153,511	Italy.....	29,902	27,136
Australia (Tasmania).....	69,750	69,820	Norway.....	40,624	45,000
FOREIGN COUNTRIES			Poland.....	19,300	18,600
Belgium.....	7,739	8,050	United States.....	104,921	83,279
France.....	24,250	28,300	Japan (estimated).....	12,000	(a)

(a) Information not available.

CHAPTER FOUR

THE NICKEL-COPPER INDUSTRY IN CANADA

1. Definition of the Industry.
2. General Review.
3. Commodity statistics, including tables showing production by provinces, imports, exports, prices and world output of nickel, copper and metals of the platinum group.

1. Definition of the Industry

The nickel-copper industry in Canada includes the mining, smelting and, to a certain extent, the refining of the nickel-copper ores of the Sudbury district in the province of Ontario. Smelting and copper refining operations are carried on in close proximity to the mines; nickel refining is conducted at Port Colborne, Ontario. Matte is exported for treatment in plants at Huntington, West Virginia, U.S.A., Kristiansand, Norway, and Clydach, Wales.

As thus described, the industry in Canada constitutes the national source of nickel, most of the platinum group metals and a large part of the Canadian copper production. Gold, silver, tellurium and selenium in increasing quantities are also recovered from these ores.

Mines in the copper-gold-silver group also contribute largely to the total Dominion copper output; ores from these properties contain, in the aggregate, about 11 per cent of the annual gold production. The activities of the copper-gold mines are reviewed in the chapter on the gold mining industry. Production and trade statistics on nickel, copper and the metals of the platinum group are given in this chapter.

General Review

The entire production of Canadian nickel in 1938 originated in the nickel-copper ores of the Sudbury district, Ontario, and represented the recovery of the metal in the refined metallic state in salts and oxides and in matte exported. Copper recovered in 1938 from these same ores comprised the metal contained in converter copper produced in Canada together with the copper content of matte exported. The nickel-bearing deposits of the Sudbury area also contain relatively high values in platinum metals and the recoveries of these metals in 1938 were the largest ever realized in the history of the Canadian nickel-copper mining industry.

In addition to production of nickel, copper and the platinum metals there is an increasing output from these ores of the associated metals—silver, gold, selenium and tellurium; sulphur for the manufacture of sulphuric acid is also recovered in the gaseous state from waste smelter gases. It is interesting to note that silver recovered from the Sudbury nickel-copper ores totalled 2,505,129 fine ounces in 1938 and represented 11.27 per cent of the total silver produced by the entire Canadian mining industry. Gold recovered from Canadian nickel-copper ores totalled 80,227 fine ounces in 1938.

Two companies operate both mines and metallurgical plants in the Sudbury area. The International Nickel Co. of Canada, Limited, conducts smelting operations at Copper Cliff and Coniston, Ontario, while the Falconbridge Nickel Mines, Ltd., smelts its ores at the Falconbridge mine located a few miles east of the town of Sudbury. This last named company treats

its matte in a refinery located at Kristiansand, Norway. The relatively small amount of nickel oxide produced at Deloro, Ontario, is recovered from silver-cobalt-nickel-arsenic ores mined in Northern Ontario. Smelter matte made by the International Nickel Co. of Canada, Limited, is treated in plants located at Clydach, Wales; Huntington, West Virginia, and at Port Colborne and Copper Cliff, Ontario.

The International Nickel Co. of Canada, Limited, reported that underground development was continued at the Froid, Creighton, Levack and Garson mines at a rate compatible with ore production requirements. The concentrator milled 4,519,652 tons of ore and the Copper Cliff smelter produced 182,904 tons of bessemer matte and 158,912 tons of converter copper. The Coniston smelter was operated continuously processing 832,906 tons of ore and producing 48,608 tons of bessemer matte. The nickel refinery of the company, located at Port Colborne, Ontario, produced 124,233,682 pounds of refined nickel of which 115,482,436 pounds were electrolytically refined. The copper refinery of the company's subsidiary—The Ontario Refining Company, Ltd.—received 158,793 tons of converter copper, transferred in a molten state from the Copper Cliff smelter, and produced 145,141 tons of refined copper. The output of nickel in pellet form at the Clydach, Wales, nickel refinery of the Mond Nickel Company, Ltd., was 43,962,458 pounds comparable with 39,554,965 pounds in 1937; in addition, 2,447,239 pounds of nickel were absorbed in the production of 11,821,980 pounds of nickel salts in 1938. The output of platinum metals and gold in the Acton, England, refinery increased during the year under review. The mine development program by Petsamon Nikkeli O/Y (Mond Nickel Company, Ltd.) in Finland progressed satisfactorily; since 1933 expenditures on this property have totalled \$2,975,373 and the construction of a smelting plant was actively under way in 1938.

The total number of employees of the International Nickel Co. of Canada, Limited (and associated companies) at the end of 1938 was 17,282, distributed as follows—Canada, 10,147; Great Britain, 3,490; United States, 2,121; Finland, 1,457, and other countries, 67. The retirement system for the benefit of employees, which is financed entirely by the company, completed its eleventh year of operation and 345 pensions and 68 death benefits were paid during 1938.

Proven ore reserves of the International Nickel Co. of Canada, Limited, at December 31, 1938, excluding Petsamon Nikkeli O/Y, were 212,368,000 short tons; the nickel-copper contents of the ore reserves are calculated to be 6,806,000 tons, an increase over 1937 of 67,000 tons.

Ore treated by Falconbridge Nickel Mines, Ltd., in 1938 totalled 409,938 tons comprising 252,866 tons of milling ore and 238,072 tons of smelting ore; matte produced amounted to 14,779·1 short tons containing 8,012·7 short tons of nickel and 4,108·5 short tons of copper. Metals recovered per ton of ore treated were—nickel, 32·64 pounds and copper, 16·74 pounds. Metallurgical losses per ton treated were 3·49 pounds nickel and 2·27 pounds copper; only 5,421 tons of waste was picked and discarded from hoisted ore. The Norwegian refinery of the Company operated steadily and normally throughout the year. The metals in Falconbridge matte received in 1938, less refinery losses, were—nickel, 15,803,958 pounds and copper, 7,840,033 pounds; there were produced in marketable form during the year 16,425,735 pounds of nickel and 8,250,642 pounds of copper. Ore reserves of Falconbridge Nickel Mines, Ltd., as of December 31, 1938, were reported at 6,881,000 tons averaging 1·80 per cent nickel and 0·97 per cent copper.

Development or exploration programs were also conducted on nickel-copper deposits in the Sudbury area in 1938 by Nickel Offsets Ltd., Denison Nickel Mines, Ltd., and Anglo-Sudbury Nickel Corporation Ltd., while surface surveys were completed in the same district by the Ontario Nickel Corporation, Ltd., and Drury Nickel Mines Ltd.

In British Columbia the Western Nickel Corp. Ltd. carried on road construction near Yale and at Choate a maintenance crew was retained at the property of Pacific Nickel Mines Ltd.

Table 88.—Principal Statistics of the Nickel-Copper Mining, Smelting and Refining Industry in Canada, 1937 and 1938 (*)

	1937	1938
Number of firms.....	(a) 9	(f) 9
Number of mines.....	12	12
Number of smelters.....	3	3
Number of nickel refineries.....	1	1
Capital employed.....	\$ 104,313,953	111,947,698
Number of employees—On salary.....	323	329
On wages.....	10,435	10,075
Total.....	10,758	10,404
Salaries and wages—Salaries.....	\$ 1,075,552	1,114,511
Wages.....	\$ 17,677,175	17,122,883
Total.....	\$ 18,752,727	18,237,394
Fuel and purchased electricity used (c).....	\$ 7,454,717	6,675,789
Process supplies used (b).....	\$ 11,210,353	10,778,672
Estimated gross value of matte exported and Canadian refinery products (d).....	\$ 111,353,066	96,309,239
Value of production less items (b) and (c).....	\$ 92,687,996	78,854,778

(*) Does not include data for copper refineries, mines, power plants, etc., operated by subsidiary companies.

(a) 6 firms in Ontario, 2 in British Columbia, and 1 in New Brunswick.

(d) These data represent the values of products made in Canada from new or primary material only and do not include the value added in the electrolytic refining or other treatment of converter copper, scrap copper, customs ores, etc., in plants operated by subsidiary companies.

(e) In addition to the data shown in this table, there were approximately \$1,297,000 distributed to some 770 employees engaged chiefly in Canada during 1938 in the refining of converter copper made from nickel-copper ores, also not included in Table 88 is a value of approximately \$712,000 expended for process supplies in the refining of this particular converter copper.

(f) 7 firms in Ontario, 2 in British Columbia.

Table 89.—Output from Canadian Nickel-Copper Mines and Smelters, 1936-1938

(short tons)

	1936	1937	1938
Ore shipped from mines.....	4,634,434	6,318,907	6,276,232
Ore and concentrates treated (*).....	4,620,183	6,304,517	6,280,283
Blister copper produced in Ontario (a).....	137,369†	154,415†	147,439
Nickel produced in Ontario (b).....	51,952	73,650	62,141
Matte exported (c).....	50,644	58,673	63,423
Nickel content of matte exported.....	32,766	38,663	43,075
Copper content of matte exported.....	6,496	6,497	6,914

(*) Represents the tonnage of crude ore smelted together with the tonnage of ore milled; also in addition to the totals recorded for 1936 and 1937 a relatively small tonnage of nickel-bearing ore was exported from a property located in British Columbia.

(a) Copper content.

(b) Includes nickel content of salts and oxides produced.

(c) Less a relatively small tonnage of matte returned annually to Canada for retreatment since 1934.

† Includes reverbs from refineries and is subject to revision.

Table 90.—Capital Employed in the Nickel-Copper Mining, Smelting and Nickel Refining Industry in Canada, 1938

	\$
CAPITAL EMPLOYED AS REPRESENTED BY—	
Present cash value of the land (excluding minerals).....	4,837,473
Present value of buildings, fixtures, machinery, tools and other equipment.....	90,132,346
Inventory value of materials on hand, ore in process, fuel and miscellaneous supplies on hand.....	8,585,028
Inventory value of finished products on hand.....	5,688,387
Operating capital (cash, bills and accounts receivable, prepaid expenses, etc.).....	2,704,464
Total.....	111,947,698

Table 91.—Employees, Salaries and Wages, in the Nickel-Copper Mining, Smelting and Refining Industry in Canada, 1938

—	On salary		Mine		Mill	Total	Salaries and wages
			Surface	Underground			
Salaried employees—	Male	Female					
Mine and Mill.....	79	3				82	279,509
Smelters and refinery.....	185	62				247	835,002
Total.....	264	65				329	1,114,511
Wage-earners—							
Mine and mill.....			1,000	4,042	218	5,260	9,636,670
Smelters and refinery.....			4,815			4,815	7,486,213
Total.....			5,815	4,042	218	10,075	17,122,883
Grand Total.....	264	65	5,815	4,042	218	10,404	18,237,394

Table 92.—Number of Wage-Earners Employed in the Nickel-Copper Mining, Smelting and Nickel Refining Industry in Canada by Months, 1937 and 1938

Month	1937	1938	Month	1937	1938
January.....	9,302	10,540	July.....	11,009	9,766
February.....	9,572	10,528	August.....	11,036	9,752
March.....	9,840	10,501	September.....	11,048	9,847
April.....	10,118	10,429	October.....	10,760	9,943
May.....	10,458	10,314	November.....	10,695	9,690
June.....	10,762	9,965	December.....	10,578	9,589

NICKEL

Production figures include nickel in matte exported from the Canadian smelters valued at 18 cents per pound; refined and electrolytic nickel produced in Canada, valued at the average price received for sales of nickel metal from the refinery during the year, and the nickel equivalent in oxides or salts produced, valued in the aggregate at the price obtained from the sales of oxides or salts.

Table 93.—Production of Nickel from Canadian Ores, 1929-1938

Year	Pounds of nickel	Value	Year	Pounds of nickel	Value
		\$			\$
1929.....	110,275,912	27,115,461	1934.....	128,687,340	32,139,425
1930.....	103,768,857	24,455,123	1935.....	138,516,240	35,345,103
1931.....	65,666,320	15,267,453	1936.....	169,739,393	43,876,525
1932.....	30,327,968	7,179,862	1937.....	224,905,046	59,507,176
1933.....	83,264,658	20,130,480	1938.....	210,572,738	53,914,494

Table 94.—Production in Canada, Imports and Exports of Nickel, 1938

—	Quantity	Value
	Lb.	\$
PRODUCTION—		
Nickel in matte, speiss, residues, etc., exported.....	210,572,738	53,914,494
Refined and electrolytic nickel produced in Canada.....		
Nickel in oxides and salts sold or produced.....		
IMPORTS—		
Nickel, nickel silver and German silver in ingots or block, n.o.p.....	24,226	6,603
Nickel in bars and rods, strips, sheets and plates.....	830,904	330,131
Refined and electrolytic nickel in bars, rods, strips, sheets, plates or anodes.....	82,569	22,107
Nickel chromium in bars or rods, etc.....	43,472	41,805
German, Nevada and nickel silver, manufactures of, not plated.....		134,791
Nickel-plated household hollow-ware.....		403
Nickel kitchenware.....		1,105
Nickel-plated ware, n.o.p.....		864,393
Total Nickel and its Products.....		1,401,338
EXPORTS—		
Total (metal in all forms).....	197,704,000	52,496,417

The nickel refining capacity of the International Nickel Co. of Canada, Limited, at the end of 1938 was 42,000,000 pounds per annum at Clydach, Wales, and 148,000,000 pounds (electrolytic nickel) at Port Colborne, Ontario. In addition, the company has a capacity to produce 35,000,000 pounds of nickel in the form of oxide, alloys, salts and other forms.

During 1938 there were 259 long tons of nickel metal valued at \$176,534 consumed in Canada in the manufacture of alloy steels compared with 360 long tons at \$245,608 in 1937.

Table 95.—World Nickel Consumption, 1938

(International Nickel Company of Canada, Limited)

	Per cent
Steel mills and steel foundries.....	60
Iron and brass foundries.....	5
Brass and copper mills.....	14
Alloy manufacturers (including the company's own plants producing malleable nickel, "Monel" and other nickel alloys).....	13
Electroplaters and chemical manufacturers.....	8
Total.....	100

World consumption of nickel suffered a recession in 1938 from its peak volume reached in 1937 and it is estimated at 204,000,000 pounds against 240,000,000 pounds in 1937 and 200,000,000 pounds in 1936. The decrease of nickel consumption in 1938 occurred principally in the United States markets, the consumption in European and other markets as a whole showing little change.

Table 96.—World Production of Nickel Ore, 1937 and 1938

(Supplied by Imperial Institute)

(In terms of metal)

(Long tons)

Producing country	1937	1938	Producing country	1937	1938
BRITISH EMPIRE			FOREIGN COUNTRIES—Con.		
Southern Rhodesia (estimated) ..	4	75	Greece (e).....	951	(a)
Union of South Africa.....		44	Norway.....	863	1,100
Canada.....	100,404	94,006	U.S.S.R. (estimated).....	2,000	2,500
Burma (b).....	1,214	944	Egypt.....	14	32
Australia.....		20	Morocco (French).....	250	316
Total.....	101,600	95,100	United States (d).....	196	371
FOREIGN COUNTRIES			Brazil.....	102	(a)
Italy.....	67	(a)	New Caledonia (c).....	11,100	12,300
			Total.....	15,500	18,000
			World's Total.....	117,000	113,000

Nickel ores are also produced in Germany and the Netherlands East Indies.

(a) Information not available.

(b) Nickel content of speiss obtained as a by-product in smelting operations.

(c) Estimated content of ore as mined. The estimated content of ore, matte, etc., exported was—

1937..... 5,800 long tons
1938..... 7,250 "

(d) Nickel content of salts and nickel produced as a by-product in the electrolytic refining of copper (partly from imported blister copper).

Secondary metal was recovered in the United States as follows:—

1937..... 2,143 long tons
1938..... 2,054 "

(e) Figures represent combined totals of nickel content and cobalt content of ores.

COPPER

Production of primary copper in Canada, from all sources, totalled 571,249,664 pounds valued at \$56,554,034 during 1938 compared with 530,028,615 pounds worth \$68,917,219 in 1937. The quantity of the metal recovered in 1938 was the greatest ever recorded in the history of the Canadian mining industry and its value surpassed only by that realized in the preceding year.

Of the total output in 1938 the Mines of Ontario contributed 54.1 per cent; Quebec 19.7 per cent; British Columbia 11.5 per cent and Manitoba and Saskatchewan 14.6 per cent; in addition a relatively small amount of copper was recovered from pitchblende-silver ores mined in the Northwest Territories. In 1938 the total production of copper in the Dominion comprised 475,611,107 pounds valued at \$47,427,940 contained in anode or blister copper, 81,810,070 pounds worth \$8,158,100 in ores, concentrates and copper matte exported and 13,828,487 pounds at \$967,994 in nickel-copper matte shipped to smelters other than Canadian.

According to the International Nickel Co. of Canada, Limited, world markets for copper were influenced during most of 1938 by the reduced rate of industrial activity in the United States; in other markets, however, consumption of copper was well maintained and partly compensated for the lag in industrial demand in the United States. Despite heavy demands for copper during 1938, prices remained reasonably stable as compared with the preceding year, when prices, as registered on the London Metal Exchange, varied from the equivalent of approximately 9.65 cents to 17.67 cents per pound. During 1938 the low price was 8.27 cents and the high 11.60 cents.

Table 97.—Production of Copper from Canadian Ores, 1929-1938

Year	Pounds	Value	Year	Pounds	Value
		\$			\$
1929.....	248,120,760	43,415,251	1934.....	364,761,062	26,671,438
1930.....	303,478,356	37,948,359	1935.....	418,997,700	32,311,960
1931.....	292,304,390	24,114,065	1936.....	421,027,732	39,514,101
1932.....	247,679,070	15,294,058	1937.....	530,028,615	68,917,219
1933.....	299,982,448	21,634,853	1938.....	571,249,664	56,554,034

Table 98.—Production of Copper in Canada, by Provinces and Sources, 1937 and 1938

	1937		1938	
	Pounds	Value	Pounds	Value
		\$		\$
PRODUCTION—				
By Provinces—				
Nova Scotia.....	180,609	23,620		
Quebec.....	94,653,132	12,378,737	112,645,797	11,233,039
Ontario.....	322,039,208	41,716,364	309,030,106	30,405,500
Manitoba.....	44,920,835	5,874,747	65,582,772	6,539,914
Saskatchewan.....	22,436,843	2,934,290	18,156,157	1,810,532
British Columbia.....	45,797,988	5,989,461	65,759,265	6,557,514
Northwest Territories.....			75,567	7,535
Total.....	530,028,615	68,917,219	571,249,664	56,554,034
By Sources—				
In blister and anode copper produced.....	463,025,584	60,554,486	475,611,107	47,427,940
In ores, concentrates and copper matte exported (a).....	54,010,039	7,063,434	81,810,070	8,158,100
In nickel-copper matte exported.....	12,992,992	1,299,299	13,828,487	967,994
Total.....	530,028,615	68,917,219	571,249,664	56,554,034

(a) Contains a relatively small quantity of copper contained in gold and silver ores shipped to Canadian smelters.

Table 99.—Production of Refined Copper in Canada, 1931-1938

Year	Short tons	Year	Short ton
1931.....	92,183	1935.....	173,290
1932.....	90,077	1936.....	191,818
1933.....	112,245	1937.....	215,080
1934.....	149,261	1938.....	227,240

Table 100.—Available Statistics on the Consumption of Copper in Specified Canadian Industries, 1937 and 1938

Industry	Item (Used)	1937	1938
Brass and copper products (a).....	Ingots, wire bars, slabs, etc. lb.	110,573,509	101,588,470
	Scrap..... lb.	4,864,385	3,929,241
	Rods..... lb.	13,004	87,904
	Pipe and tubing..... lb.	98,254	773,770
	Plates and sheets..... lb.	889,449	237,858
	Wire..... lb.	323,266	34,087
	Castings..... lb.	5,324	
White Metal Alloys.....	Other..... lb.	97,103	
	Scrap, all kinds..... lb.	2,029,900	2,162,192
Electrical Apparatus and Supplies.....	Copper..... lb.	51,253	51,017
	Castings..... lb.	165,963	89,121
	Ingots, slabs, wire bars, etc. lb.	866,281	669,615
	Rods..... lb.	34,367,135	24,152,604
	Scrap..... lb.	170,463	42,751
	Tubing and pipe..... lb.	427,010	322,969
	Sheets and plates..... lb.	570,893	353,806
Iron and Steel and Their Products.....	Wire, bare..... lb.	5,357,119	4,955,851
	Wire, enamelled..... \$	546,076	395,887
	Wire, other insulated..... \$	954,553	821,389
	Copper sheets, bars, etc..... lb.	7,696,884	4,939,785

(a) A relatively large part of the copper included under this industry is rolled into wire rods, which are sold to manufacturers of electrical cable; duplication to this extent results from the inclusion of these rods in the electrical apparatus industry.

Table 101.—Imports into Canada and Exports of Copper, 1938

	1938	
	Pounds	Value
IMPORTS—		\$
Copper in bars or rods, when imported by manufacturers of trolley, telegraph and telephone wires and electric cables for use only in the manufacture of such articles in their own factories.....	1,111,000	146,771
Copper bars for use only in the manufacture of rods to be used exclusively in the manufacture of electrical conductors, and copper rods for such manufacture, individual units of conductors not to exceed area of No. 7-0 gauge conductor.....	5,500	667
Copper in bars or rods, in lengths of not less than 6 feet, unmanufactured.....	200,600	31,666
Copper in blocks, pigs or ingots.....	12,200	1,441
Copper, scrap, cathode plates, etc.....	87,800	8,434
Copper in strips, sheets or plates not polished or coated.....	166,200	36,813
Copper tubings in lengths of not less than 6 feet, and not polished, bent or otherwise manufactured.....	343,071	93,255
Copper wire.....	16,352	3,351
Copper wire cloth, or woven wire of copper.....		3,284
Copper, manufactures of, n.o.p.....		402,293
Copper, precipitate of, crude.....	2,075	193
Anodes of nickel, zinc, copper, silver or gold.....		8,432
Copper, sub-acetate of, or verdigris, dry.....	3,505	771
Copper, sulphate of (blue vitriol).....	4,454,073	160,032
Copper rollers adapted for use in calico printing.....		65,525
Total		962,928
EXPORTS—		
Copper, fine, contained in ore, matte, regulus, etc.....	109,806,100	7,637,581
Copper, blister.....	30,527,300	3,056,241
Copper, old and scrap.....	3,437,400	205,059
Copper in ingots, bars, cakes, slabs and billets.....	363,528,700	35,888,006
Copper in rods, strips, sheets, plates, and tubing.....	53,512,900	5,767,622
Copper wire and cable.....		435,784
Copper manufactures, n.o.p.....		354,509
Total		53,314,802
Copper coin, foreign.....		6,693
Copper coin, Canadian.....		347

Table 102.—Canadian Copper Ore Reserves as Officially Reported
(American Bureau of Metal Statistics)

—	Year	Province	Short tons ore	Average grade	Short tons copper
Falconbridge (a).....	1938	Ontario.....	6,881,000	% 0.97	66,700
Granby Consolidated—Allenby.....	1938	British Columbia...	11,108,905	1.40	155,500
Hudson Bay.....	1938	Manitoba.....	27,539,000	2.23	614,000
International Nickel (a).....	1938	Ontario.....	212,368,000	.....	(b)6,806,000
Noranda.....	1938	Quebec.....	30,001,000	2.47	742,500
Normetal.....	1935	Quebec.....	782,600	2.13	16,700
Sherritt Gordon.....	1938	Manitoba.....	4,829,500	2.45	118,300
Waite-Amulet.....	1938	Quebec.....			
Amulet section.....			3,428,260	5.96	204,400
Waite section.....			525,000	5.30	27,800
Britannia.....		British Columbia...	(c)	(c)	(c)
Consolidated Copper and Sulphur.....		Quebec.....	(c)	(c)	(c)
Aldermac Mines Ltd.....	1937	Quebec.....	2,082,000	2.00	41,600

(a) Also produces nickel.

(b) Copper-nickel content.

(c) Data not available.

Table 103.—World Production of Copper Ore, 1937 and 1938

(Imperial Institute)

(In terms of metal)

(Long tons)

Producing Country.	1937	1938	Producing Country	1937	1938
BRITISH EMPIRE			FOREIGN COUNTRIES—conc.		
United Kingdom.....	36	36	Portugal.....	5,518	4,807
Northern Rhodesia.....	245,888	250,877	Roumania.....	563	(a)
Southern Rhodesia.....		5	Spain (estimated).....	27,000	30,000
South West Africa (c).....	11,600	8,750	Sweden.....	7,061	9,142
Union of South Africa.....	11,209	11,127	U.S.S.R. (estimated).....	90,000	100,000
Canada (e).....	236,620	255,022	Yugoslavia.....	41,600	48,700
Newfoundland.....	8,326	7,926	Algeria.....	382	(a)
Burma (estimated).....	3,700	3,500	Belgian Congo (smelter).....	148,210	121,985
Cyprus (estimated).....	27,027	34,000	Morocco (Spanish).....	83	.....
Federated Malay States.....			Cuba.....	12,983	14,203
India (estimated).....	7,100	5,500	Honduras.....	94	81
Australia.....	19,127	19,446	Mexico (e).....	45,350	41,190
Total.....	570,000	600,000	United States (e).....	751,784	498,003
FOREIGN COUNTRIES			Argentina.....	28	(a)
Austria.....	12	(a)	Bolivia (exports).....	3,641	2,839
Bulgaria.....	20	100	Chile (e).....	410,000	345,821
Czechoslovakia (d).....	698	(a)	Panama.....		
Finland.....	12,600	13,100	Peru.....	42,693	(b) 37,154
France.....	582	(a)	Formosa (estimated).....	(a)	(a)
Germany.....	29,769	30,000	Japan.....	(b) 75,000	(b) 80,000
Greece.....	300	(a)	Korea.....	(a)	(a)
Hungary.....	(a)	(a)	Philippine Islands.....	1,000	3,472
Italy.....	1,125	(a)	Turkey.....	400	2,449
Norway.....	19,760	20,700	Total.....	1,730,000	1,420,000
			World's Total.....	2,300,000	2,020,000

(a) Information not available.

(b) Estimated.

(c) Years ended March 31 following.

(d) Cu content of iron ores.

(e) Amount estimated as recoverable.

Table 104.—World Metal Production of Copper, 1937 and 1938

(Supplied by Imperial Institute)

(Long tons)

Producing Country.	1937	1938	Producing Country.	1937	1938
BRITISH EMPIRE			FOREIGN COUNTRIES—conc.		
United Kingdom (b).....	7,400	7,100	Italy.....	1,446	2,916
Northern Rhodesia.....	208,187	213,031	Norway.....	8,171	10,300
Union of South Africa.....	13,092	13,255	Spain (estimated).....	10,000	12,000
Canada (c).....	208,187	212,326	Sweden.....	9,940	11,106
India.....	6,830	5,330	U.S.S.R. (estimated).....	90,000	95,000
Australia.....	17,400	17,098	Yugoslavia.....	38,788	41,330
Total.....	461,000	468,000	Belgian Congo.....	148,210	121,985
FOREIGN COUNTRIES			Mexico.....	(e) 45,000	39,950
Austria.....	2,041	(d)	United States.....	807,377	561,758
Belgium.....	88,834	(a)	Chile.....	406,659	332,187
Czecho-Slovakia.....	1,981	(a)	Peru.....	34,483	(g) 35,403
Finland.....	10,428	11,822	Japan.....	86,215	(e) 100,000
France.....	1,027	(a)	Korea.....	5,041	(a)
Germany (f).....	64,400	(d) 67,700	Total.....	1,860,000	1,540,000
			World's Total.....	2,320,000	2,010,000

(a) Information not available.

(b) Includes some copper going direct into sulphate production.

(c) Copper content of blister copper.

(d) Austria included with Germany.

(e) Estimated.

(f) Metallgesellschaft figures.

(g) Exports.

METALS OF THE PLATINUM GROUP

The entire output of the metals of this group was derived from the nickel-copper ores of the Sudbury district in Ontario with the exception of 16 ounces of platinum recovered from alluvial workings in the Province of British Columbia. The average price of platinum in 1938 on the London market was £6.55 compared with £9.811 in 1937.

Platinum metals contained in matte from Sudbury ores by the International Nickel Company of Canada Limited are refined at Acton, England, and the same metals contained in matte produced in the Sudbury area by the Falconbridge Nickel Mines Limited are recovered in the refinery of that company which is located at Kristiansand, Norway. The Canadian production of platinum from 1902 to 1938 inclusive totalled approximately 861,613 fine ounces valued at \$36,502,297; the recovery of other platinum metals during the same period is estimated at 770,467 fine ounces.

Table 105.—Production of Platinum Group Metals in Canada, 1937 and 1938

	Platinum		Palladium, Rhodium, Iridium, etc.	
	Fine ounces	\$	Fine ounces	\$
1937				
Ontario.....	139,355	6,751,750	119,829	3,179,782
British Columbia.....	22	1,066		
Total.....	139,377	6,752,816	119,829	3,179,782
1938				
Ontario.....	161,310	5,196,279	130,893	3,677,342
British Columbia.....	16	515		
Total.....	161,326	5,196,794	130,893	3,677,342

Table 106.—Production of Metals of the Platinum Group, 1929-1938

Year	Platinum				Palladium*	
	Lode		Placer			
	Fine oz.	\$	Fine oz.	\$	Fine oz.	\$
1929.....	12,491	845,057	28	1,699	12,408	471,614
1930.....	34,007	1,542,490	17	771	29,959	689,217
1931.....	44,725	1,595,117	50	1,783	39,313	786,260
1932.....	27,284	1,097,021	59	2,372	29,727	548,582
1933.....	24,746	856,190	40	1,400	31,009	645,043
1934.....	116,177	4,488,712	53	2,051	83,932	1,699,228
1935.....	105,335	3,444,455	39	1,275	84,772	1,962,937
1936.....	131,551	5,319,922	20	809	103,671	2,483,075
1937.....	139,355	6,751,750	22	1,066	119,829	3,179,782
1938.....	161,310	5,196,279	16	515	130,893	3,677,342

* Since 1933 includes other platinum metals except platinum.

Table 107.—Production of Certain Metals of the Platinum Group, 1926-1932*

Year	Rhodium		Ruthenium		Osmium		Iridium	
	Fine oz.	\$	Fine oz.	\$	Fine oz.	\$	Fine oz.	\$
1926.....	204	9,969	16	791	.....	.....	14	3,252
1927.....	222	6,853	31	1,073	.....	.....	45	4,945
1928.....	895	20,951	561	16,331	.....	.....	342	78,553
1929.....	3,037	151,850	1,376	66,048	.....	.....	497	119,777
1930.....	(a) 4,133	206,650	.....	.....	.....	.....	.....	.....
1931.....	(a) 7,605	431,457	.....	.....	.....	.....	.....	.....
1932.....	(a) 7,886	353,308	.....	.....	.....	.....	.....	.....

(a) Includes rhodium, iridium and ruthenium as other platinum metals.

* Since 1933 these metals are included with palladium as shown in preceding table.

Table 108.—Imports into Canada and Exports of Platinum, 1938

	Oz.	Value
IMPORTS—		\$
Platinum retorts, pans, condensers, tubing and pipe.....	(b)	52,229
Platinum wire and bars, strips, sheets or plates, also platinum, palladium, iridium, osmium, ruthenium and rhodium in lumps, ingots, powder, sponge or scrap.....	(a)	238,389
Platinum crucibles.....		2,093
Total.....		292,711
EXPORTS—		
Platinum, and metals of the platinum group contained in concentrates or other forms.....	(c)	9,320,325
Platinum, old and scrap.....	1,106	44,490
Total.....		9,364,815

(a) \$229,379 from United Kingdom. (b) All from United States. (c) \$9,023,427 to United Kingdom.

Table 109.—Platinum Consumed in Canadian Jewellery and Silverware Industry, 1932-1938

Year	Value	Year	Value
	\$		\$
1932.....	26,928	1936.....	101,129
1933.....	35,714	1937.....	112,295
1934.....	38,307	1938.....	85,503
1935.....	45,627		

Table 110.—Platinum Metals Sold in the United States, as Reported by Refiners and Shown by Consuming Industries, 1938(From *Minerals Year Book, U.S. Bureau of Mines*)

(In Troy ounces)

Industry	Platinum	Palladium	Iridium	Others	Total	Percentage of total
1938						*
Chemical.....	14,328	402	143	159	15,032	12
Electrical.....	5,645	10,447	616	231	16,939	13
Dental.....	12,324	18,838	148	34	31,339	25
Jewellery.....	44,654	9,356	2,358	316	57,084	41
Miscellaneous and undistributed.....	10,617	35	32	628	11,312	9
Total.....	87,568	35,073	3,297	1,368	127,306	100

Table 111.—World Production of Platinum Metals, 1937-1938

(Supplied by Imperial Institute)

(Troy ounces)

Producing Country	1937	1938	Producing Country	1937	1938
BRITISH EMPIRE			FOREIGN COUNTRIES		
Sierra Leone—			U.S.S.R.—		
Crude platinum.....	308	180	Crude platinum (estimated)....	100,000	120,000
Union of South Africa—			Abyssinia (b)—		
Crude (Pt. metals content).....	17,776	18,256	Crude platinum.....	(a)	(a)
Concentrates (Pt. metals content).....	21,849	35,124	Belgian Congo—		
Osmiridium (crude) (c).....	5,790	5,354	Palladium.....	12,506	225
Canada—			Platinum.....	2,122	1,575
Crude platinum (Pt. content)....	22	7	United States (d)—		
Recovered from Ontario nickel-copper matte—			Crude platinum.....	10,803	42,043
Platinum.....	139,355	161,319	Ore (Pt. metals content).....	124	90
Other platinum metals.....	119,829	130,893	New platinum metals recovered by refineries from gold and copper ores of domestic origin—		
New South Wales—			Platinum.....	4,761	3,761
Crude platinum.....	46	(a)	Palladium.....	5,776	3,429
Tasmania—			Iridium, osmiridium, etc....	41	57
Osmiridium (crude).....	586	191	Colombia—		
New Zealand—			Crude platinum.....	29,315	29,460
Crude platinum.....	55	1	Panama—		
Papua—			Crude platinum.....	267	(a)
Crude platinum.....	20	22	Japan—		
Osmiridium (crude).....	8		Crude platinum.....	(a)	(a)

(a) Information not available.

(b) Amount registered, which is probably not total production.

(c) It is estimated by the Department of Mines, Union of South Africa, that the osmiridium sold during these years contained the following amounts of the metals mentioned below (fine ounces):—

	1936	1937	1938
Osmium.....	1,670	1,695	1,701
Iridium.....	1,432	1,493	1,563
Ruthenium.....	730	764	813
Platinum.....	641	639	634
Rhodium.....	25	27	30

(d) Secondary platinum metals recovered in the United States were as follows (troy ounces)—

	1936	1937	1938
Platinum.....	55,959	55,926	44,654
Palladium.....	6,786	12,680	13,489
Iridium.....	2,204	2,320	2,150
Other platinum metals.....	1,217	1,280	3,998

CHAPTER FIVE

MISCELLANEOUS METAL MINING INDUSTRIES IN CANADA

Including General Statistics Relating to the Industries in this Group and Commodity Statistics Showing Production by Provinces, Imports, Exports, Prices and World Output Tables on Aluminium, Antimony, Barium, Beryllium, Cadmium, Chromite, Iron Ore, Pig Iron and Ferro-Alloys, Steel and Rolled Products, Lithium, Magnesium, Manganese, Mercury, Molybdenum, Radium, Selenium, Tantalum, Tellurium, Tin, Titanium, Tungsten, Uranium, Vanadium and Zirconium.

1. General Review

Metal-bearing minerals, mined in relatively small quantities by a comparatively few operators, have been grouped by the Dominion Bureau of Statistics for consideration as a single industry. Included with the finally revised statistics relating to the Canadian production of these, are notes and statistical data pertaining to various rare or semi-rare metals or metalliferous ores produced in other countries. Metals or metal-bearing ores produced in Canada during 1938 and classified as miscellaneous include—antimony, bismuth, cadmium, mercury, molybdenite, radium and uranium products, selenium, tellurium and titanium ore. In addition to particulars relating to these metals or products, the chapter contains notes of a summary nature on beryll and beryllium, lithium, magnesium, sodium, tungsten, aluminium, tin, iron ores, vanadium, and zirconium.

It is to be noted that the majority of the metals listed above as Canadian products and including bismuth, cadmium, selenium and tellurium, represent by-products recovered in the refining of lead, zinc or copper and, for this reason, such statistics as relate to their production in Canada are included with those of either the silver-lead-zinc mining industry, the copper-gold-silver mining industry, or the non-ferrous smelting and refining industry.

For historical purposes and to provide the interested reader with available data, tables have been prepared for this chapter that set out the known facts regarding domestic and world production of these metals or ores.

2. Commodity Statistics on Aluminium, Antimony, Beryllium, Bismuth, Cadmium, Chromite, Iron Ore, Pig-Iron, Ferro-Alloys, Steel and Rolled Products, Lithium, Manganese, Mercury, Molybdenum, Radium-uranium, Selenium, Tellurium, Tin, Tantalum, Titanium, Tungsten, Vanadium, Zirconium

ALUMINIUM

The reduction of aluminium ores and the production of primary aluminium in Canada is confined to the province of Quebec. In this province the Aluminum Company of Canada, Limited, operates an ore treatment plant at Arvida and reduction plants at both Arvida and Shawinigan Falls. These three plants were in continuous operation throughout 1938. At the Arvida ore plant concentrates were made from British Guiana bauxite and aluminium ingot was produced in the two reduction works. The company also operates fabricating plants at Shawinigan Falls, Quebec, and Toronto, Ontario, and in 1938 a new plant for the production of aluminium products was under construction by the company at Kingston, Ontario. It was reported that expansion of the aluminium-reduction and alumina plants of the Aluminum Company of Canada at Arvida was completed in 1938 and that fabrication facilities were to be extended by the company at Toronto to provide for more products used in the aircraft industry. Data relating to the aluminium industry are not included with those recorded in tables of this chapter. Bauxite from British Guiana, used for the production of aluminium is washed and dried before being shipped; at Arvida, Quebec, it is treated by a standard chemical process to remove impurities, and pure aluminium oxide is recovered. Cryolite, necessary in the production of the metal, is imported from Greenland. A very large amount of electrical energy is utilized in the production of new aluminium metal from bauxite concentrates. No bauxite ores are mined in Canada and the principal bauxite producing countries are—France, Hungary, United States, Yugoslavia, Italy, British Guiana, Dutch Guiana, and Russia.

Table 112.—Imports into Canada and Exports of Aluminium, Alumina, Bauxite and Cryolite, 1938

	Cwt.	\$
IMPORTS—		
Alumina.....	1,457	17,302
Bauxite ore.....	(a) 7,365,187	2,359,933
Cryolite.....	(b) 127,985	542,397
Aluminium in pigs, ingots, blocks, notch bars, slabs, billets and blooms.....	1,381	36,780
Aluminium scrap.....	11,003	102,742
Aluminium in bars, rods and wire.....	1,817	69,163
Aluminium in plates, sheets and strips, including circles.....	17,091	615,540
Aluminium pipes and tubes.....	1,197	64,058
Aluminium leaf, less than .005 mm. thick.....		7,523
Aluminium kitchen or household hollowware, n.o.p.....		84,725
Aluminium, manufactures of, n.o.p.....		774,997
Aluminium leaf, n.o.p., or foil less than .005 inch thick, plain or embossed.....		107,321
Aluminium powder.....	1b. 146,251	53,735
Other.....		63,038
Total—Aluminium and Its Products.....		4,899,254

(a) 1,165,321 cwt. from United States and 6,199,079 cwt. from British Guiana.

(b) 124,458 cwt. from Greenland.

Table 113.—Consumption of Aluminium in Specified Canadian Industries, 1937 and 1938

Industry	1937		1938	
	Pounds	Cost at works	Pounds	Cost at works
		\$		\$
Aluminium products (a)*.....	21,660,000	4,118,972	20,590,000	3,741,609
White metal alloys*.....	1,186,128†	244,175	1,272,702	288,751
Electrical apparatus and supplies.....	1,733,533	743,718	1,660,763	472,301
Brass and copper products (b).....	2,423,015	394,807	2,220,349	277,472
Iron and steel products (b) (c).....	2,851,807	886,250	2,405,313	706,025

(a) Largely for the manufacture of cooking utensils, cable, etc.

* Not inclusive of possible scrap.

† In addition consumption of scrap aluminium was recorded at 1,309,181 pounds valued at \$166,762 in 1937 and 1,630,334 pounds at \$211,922 in 1938.

(b) Includes scrap.

(c) Includes industries manufacturing cooking and heating apparatus, sheet metal products, etc.

Table 114.—Estimated World Production of Aluminium, 1937 and 1938

(Supplied by *Imperial Institute*)

(Long tons)

Producing Country	1937	1938	Producing Country	1937	1938
BRITISH EMPIRE			FOREIGN COUNTRIES—concluded		
United Kingdom.....	19,000	23,000	Norway (c).....	23,043	26,000
Canada.....	41,000	65,000	Spain.....		600
Total.....	60,000	88,000	Sweden (c).....	2,248	2,380
FOREIGN COUNTRIES			Switzerland.....	23,500	28,000
Austria.....	4,300	4,000	U.S.S.R.....	45,000	50,000
France.....	33,932	44,600	Yugoslavia.....	200	1,191
Germany (c).....	125,208	159,000	United States (c) (b).....	130,661	128,072
Hungary.....	1,000	1,500	Japan.....	10,500	20,000
Italy (c).....	22,585	25,360	Total.....	422,000	491,000
			World's Total.....	482,000	579,000

(b) Secondary metal was recovered as follows:—

1936.....	46,000 long tons
1937.....	55,860 "
1938.....	34,640 "

(c) Official figures.

Table 115.—World Production of Bauxite, 1937 and 1938

(Supplied by Imperial Institute)
(Long tons)

Producing Country	1937	1938	Producing Country	1937	1938
BRITISH EMPIRE			FOREIGN COUNTRIES—concluded		
British Guiana—(c)			Greece	135,242	(a)
60% or more alumina	288,701	447,370	Hungary	524,243	532,177
50-60% alumina	7,817	—	Italy	380,391	355,138
30-50% alumina (b)	64,413	115,646	Roumania	10,531	11,620
Unfederated Malay States	19,000	55,081	U.S.S.R. (estimated)	250,000	250,000
India	15,150	14,768	Yugoslavia	352,167	398,180
Australia	7,766	1,320	Mozambique	(a)	(a)
Total	403,000	634,000	United States	420,232	311,354
FOREIGN COUNTRIES			Brazil (exports)	8,631	12,724
Austria (estimated)	3,000	5,000	Dutch Guiana	386,249	371,633
Czecho-Slovakia	833	(a)	French Indo-China	7,000	160
France	677,300	671,662	Netherland East Indies	195,828	241,479
Germany	18,000	19,100	Total	3,370,000	3,320,000
			World's Total	3,770,000	3,950,000

(a) Information not available.

(b) Ore remains at the mines.

(c) The shipments from mines of dried and washed ore were as follows (long tons):—

	1937	1938
Metallurgical	241,932	321,912
Chemical	48,950	46,275
Refractory	7,295	1,814
Abrasive	—	2,596

PRODUCTION (EXPORTS) OF CRYOLITE IN GREENLAND

Year	Long tons
1937	50,822
1938	49,463

ANTIMONY

Antimony production in Canada during 1938 totalled 24,560 pounds valued at \$2,200. This output represents the estimated recoverable metal contained in auriferous ore mined at West Gore, Nova Scotia. The ore as thus described was shipped for smelting in England. Prior to the close of 1938 there had been no commercial production of antimony metal in Canada since 1917 and no by-product output of the metal since 1926, in which year it was reported as contained in silver-lead-bismuth bullion produced from the cobalt-silver ores of Northern Ontario. During the first six months of 1939 the Consolidated Mining and Smelting Company of Canada Limited, recovered 388,040 pounds of antimony from British Columbia ores in its metallurgical plants located at Trail, B.C. The greater part of refined antimony made in the Dominion during past years was also produced by the same company during 1907, 1909, 1915 and 1916. In 1909, in addition to a shipment of 35 tons of concentrates, there were produced about 61,200 pounds of antimony metal, chiefly at the works of the Canadian Antimony Company Limited, at Lake George, New Brunswick.

Minerals containing antimony occur in New Brunswick, Quebec, Ontario, Manitoba, British Columbia, and the Yukon Territory. Stibnite (Sb_2S_3) occurs in the veins of the Reliance Gold Mines, Bridge River mining district, British Columbia, and in the same province at the property of the Gray Rock Mining Syndicate in the Truax Creek area, and at the Congress mine adjoining the Reliance property. In 1938 prospecting of antimony deposits on the Snowshoe group of claims, North-Eastern District, British Columbia, was reported by the British Columbia Department of Mines.

Table 116.—Antimony Used in Specified Canadian Industries, 1937 and 1938

Industry	1937		1938	
	Pounds	\$	Pounds	\$
White metal alloys	(x) 573,575	79,936	514,027	68,962
Electrical apparatus and supplies	186,275	25,996	76,149	10,997

(x) Regulus. In addition the industry reported the consumption of 263,462 pounds of antimony ore valued at \$12,496 in 1937 and 145,440 pounds at \$7,575 in 1938.

Table 117.—Imports of Antimony and Antimony Products into Canada, 1938

	Pounds	\$
Antimony or regulus of, not ground, pulverized or otherwise treated.....	856,986	85,461
Antimony oxide and titanium oxide (x).....	4,710,481	512,219
Antimony salts—tartar emetic, etc.....	62,016	9,376
Antimony salts for dyeing.....	25	23
Type metal in blocks, bars, plates and sheets.....	540,959	20,746

(x) Including white pigments containing not less than 14 per cent by weight of titanium.

Table 118.—World Production of Antimony Ore, 1937 and 1938

(In terms of metal)
(Supplied by Imperial Institute)
(Long tons)

Producing Country	1937	1938	Producing Country.	1937	1938
BRITISH EMPIRE			FOREIGN COUNTRIES—concluded		
Southern Rhodesia.....	78	77	Algeria.....	958	1,010
Union of South Africa.....		12	Morocco (French).....	26	155
Canada.....		11	Morocco (Spanish).....	206	80
Burma (estimated).....	30	90	Mexico.....	10,471	7,907
India.....	(c) 5	13	United States (b).....	1,130	580
Sarawak.....	5		Argentina.....	10	(a)
Australia.....	567	(a) —	Bolivia (exports).....	7,014	9,287
FOREIGN COUNTRIES			Honduras.....	(a)	(a)
Austria.....	248	(a)	Peru.....	1,396	662
Czecho-Slovakia.....	1,226	(a)	China.....	15,000	8,000
Greece.....		(a)	French Indo-China.....	6	102
Italy.....	600	910	Japan.....	(a)	(a)
Portugal.....	61	161	Korea.....	10	(a)
Yugoslavia.....	1,780	3,370	Turkey.....	659	490

(a) Information not available.

(b) Secondary metal was recovered as follows:—

1936.....	8,800 long tons
1937.....	11,018 "
1938.....	7,590 "

(c) Included with 1938.

BARIUM

A report on barium minerals by the Imperial Institute, London, contains the following information:—"A series of lead-calcium-barium alloys known in some cases as Frary metal and others as Ferry metal, are used for bearing purposes. The amount of barium is about 2 per cent and the bulk of the alloy is lead. The alloys are manufactured electrolytically from molten chlorides using a cathode of molten lead, and are used in the same manner as other 'white' metals. Aluminium and barium form a series of alloys which have greater fluidity than pure aluminium. A range of barium-aluminium and barium-magnesium alloys are being produced by an English firm under the trade name 'Baral' and 'Barmag'. The proportion of barium varies up to as much as 50 per cent, but the consumers in the wireless valve trade usually require the 'Baral' alloy to contain 45 to 50 per cent of barium and the 'Barmag' alloy to carry 25 to 30 per cent barium. With nickel, barium forms an alloy (0.2 per cent barium) which is stated to exhibit greater resistance to the action of hot corrosive gases than does pure nickel, and on this account it has been used for the manufacture of sparking plug electrodes.

"The metal can be prepared by heating barium oxide (BaO) and peroxide (BaO_2) to 1350°C . in an electric furnace, with a metal having a high heat of oxidation, aluminium being suitable for this purpose. Barium is an extremely active deoxidizer, combines with many gases and in the radio industry is inserted, in the form of copper-clad wire, into valves (tubes) to remove the last traces of gas."

Barium has been produced in the United States, Germany, France and Great Britain, but not yet commercially in Canada. "Mineral Industry" reported in 1936 that the price of barium has been continuously reduced and it is probably now available at \$5.00 per pound or less.

BERYLLIUM

The principal ore of beryllium is the mineral beryl— $\text{Be}_3\text{Al}_2(\text{SiO}_3)_6$. There are several known occurrences of this mineral in Canada, and shipments of beryl have been made for experimental purposes from deposits in Renfrew county, Ontario, and the Oiseau river area in Manitoba. Beryl usually occurs in pegmatites and is sometimes recovered as a by-product in the mining of the feldspar and mica content of these rocks. No commercial production of beryl has ever been officially reported in Canada, however, in 1938, Canadian Beryllium Mines and Alloys Limited, conducted development work on a beryl-feldspar deposit located on lot 25, Lyndock township, Renfrew county, Ontario. It was reported that the company had some 40 tons of beryllium ore available for treatment at the close of 1938.

Notwithstanding the great interest displayed by several chemical-manufacturing companies, inventors and investors, as well as the various rumours of new enterprises engaged in producing beryllium, world output probably still fails to exceed 500 tons a year, according to Paul M. Tyler, of the United States Bureau of Mines. In the United States the commercial supply of the metal and its compounds continues to come entirely from two companies—the Beryllium Corporation of Pennsylvania, Temple, Pa., and the Brush Beryllium Corporation, 3714 Chester Avenue, Cleveland, Ohio. The Beryllium Corporation which has a co-operative arrangement with Siemens & Halske, of Germany, for the exchange of information and patents, has completed a fabricating plant at Reading, Pa., the first to be designed especially for rolling and drawing beryllium alloys. About 1 ton of beryllium worth 3,000 franc per kilogram (about \$40 a pound) is now being produced annually in France by electrolysis in a fluoride bath from beryl obtained near Limoges and Autun, supplemented by supplies from Madagascar. Italy, Japan and possibly other countries are credited with small or occasional outputs, but the United States and Germany produce the bulk of the world's beryllium in the form of alloys.

BISMUTH

Bismuth production in Canada represents the metal recovered from silver-lead ores smelted at Trail, British Columbia, and the metal contained in silver-lead-bismuth bullion produced in the treatment of silver-cobalt ores at Deloro, Ontario. Production in 1938 came entirely from the treatment of silver-cobalt ores in the Deloro smelter and totalled 9,516 pounds valued at \$9,754. The total output of bismuth in the Dominion to the close of 1938 amounted to 1,122,303 pounds worth \$1,309,406. The largest annual production occurred in 1936, in which year 364,165 pounds valued at \$360,523 were recovered.

Imports of metallic bismuth into Canada in 1938 totalled 297 pounds valued at \$303 compared with 34 pounds at \$40 in 1937; these imports came entirely from the United States. Imports of bismuth salts into Canada in 1938 were appraised at \$16,756 compared with \$17,489 in the preceding year.

Bismuth is consumed chiefly in the manufacture of pharmaceuticals and alloys. According to U. S. Bureau of Mines report, pharmaceutical and medicinal manufacturers have heretofore used about 75 per cent and low-melting-point and non-shrinking alloys the balance. The metal is employed in almost all low-melting metallic alloys used for fusible plugs, safety devices, dental models, soft solders and tempering baths for small tools and pieces. The principal alloying components used with bismuth are lead, tin and cadmium. The recently developed free-cutting aluminium alloy 11S contains a small percentage of bismuth. Bismuth also is used in small quantities in iron castings, in special brake linings, in enamelling and the manufacture of optical glass, in the manufacture of special instruments, and in plastics as bismuth subnitrate. "Metal and Mineral Markets", New York, quoted bismuth metal, September, 1939—per pound in ton lots, \$1.10; London, 4s. 6d.

Table 119.—Production of *Bismuth in Canada, 1929-1938

Year	Pounds	\$	Year	Pounds	\$
1929.....	194,329	307,114	1934.....	253,644	301,215
1930.....	12,732	6,366	1935.....	13,797	13,245
1931.....	118,207	157,650	1936.....	364,165	360,523
1932.....	16,855	7,340	1937.....	5,711	5,654
1933.....	78,303	81,526	1938.....	9,516	9,754

* First commercial production in 1924.

Table 120.—Bismuth Used in the Manufacture of Canadian Medicinal and Pharmaceutical Preparations, 1937 and 1938

Item	1937		1938	
	Pounds	\$	Pounds	\$
Bismuth metal.....	27,089	24,231	26,643	23,951
Bismuth salts.....	12,306	19,702	12,779	19,107

Table 121.—World Production of Bismuth Ore, Etc.*, 1937 and 1938(Supplied by *Imperial Institute*)
(Cwt.)

Producing Country and Description	1937	1938	Producing Country and Description	1937	1938
BRITISH EMPIRE			FOREIGN COUNTRIES—Con.		
Uganda—			Norway—		
Ore.....		8	Copper ore (<i>Bi content</i>).....	7	(a)
Union of South Africa—			Roumania—		
Ore (<i>Bi content</i>).....	368	52	Bismuth-Molybdenum ore.....	530	3,228
Canada—			Mexico—		
Metal and content of bullion....	51	85	Ore (<i>Bi content</i>).....	2,789	3,657
Burma—			Argentina—		
Ore.....	2		Ore (<i>Bi content</i>).....	160	(a)
Australia—			Bolivia (exports)—		
Ore, etc.....	174	132	Ore, etc. (<i>Bi content</i>).....	607	338
FOREIGN COUNTRIES			Peru—		
France—			Lead-silver bullion, etc. (<i>Bi content</i>).....	362	(b) 248
Mispickel (<i>Bi content</i>).....	(a)	(a)	Metal.....	1,318	(b) 4,059
Metal.....	(a)	(a)	Japan—		
			Metal.....	(a)	(a)

* Bismuth ore is also produced in Germany, Spain and China and the metal recovered as a by-product in the United Kingdom, Sweden, U.S.S.R. and the United States.

(a) Information not available.

(b) Exports.

CADMIUM

Cadmium production in Canada represents the recovery of the metal as a by-product in the electrolytic refining of zinc at Trail, British Columbia and at Flin Flon, Manitoba.

Cadmium is consumed largely in the manufacture of alloys and for plating, also in the making of such pigments as cadmium lithopone, cadmium yellows, etc. A relatively large quantity of the metal is used in the production of bearing metals for high-speed internal combustion engines. "Metal and Mineral Markets", New York, quoted cadmium September, 1939—per pound commercial sticks, wholesale quantities, 65 cents.

Table 122.—Cadmium Production in Canada, 1928-1938

Year	British Columbia		Manitoba		Saskatchewan	
	Pounds	\$	Pounds	\$	Pounds	\$
1928*	491,894	341,374				
1929	773,976	675,294				
1930	456,582	337,871				
1931	323,139	180,958				
1932	65,425	26,824				
1933	246,041	78,733				
1934	293,611	95,665				
1935	580,530	441,203				
1936	526,034	468,170	148,133	131,838	111,749	99,457
1937	436,431	715,747	164,223	269,326	144,553	237,067
1938	510,342	410,090	115,166	92,543	73,630	59,166

* First production.

In 1937 there were 65,796 pounds of cadmium valued at \$84,993 used in the Canadian white metal alloys industry; the consumption of the metal in the same industry during 1936 was 48,939 pounds, worth \$41,561.

Table 123.—World Production of Cadmium, 1937 and 1938.

(Supplied by *Imperial Institute.*)

(Lb. avdp.)

Producing Country	1937	1938	Producing Country	1937	1938
BRITISH EMPIRE			FOREIGN COUNTRIES—Con.		
United Kingdom.....	273,688	275,354	Germany.....	783,000	957,000
South West Africa (d).....	305,000	255,000	Italy.....	200,000	152,000
Canada.....	745,207	699,138	Norway.....	339,935	458,000
Australia.....	464,311	439,436	Poland.....	274,000	538,000
FOREIGN COUNTRIES			U.S.S.R.....	(a)	(a)
Belgium.....	598,000	400,000	United States—		
France.....	218,000	256,000	Metal.....	3,995,739	3,753,323
			Compounds (metal content)....	828,000	431,000
			Mexico (b).....	1,366,407	1,680,800

Cadmium is also produced in the Netherlands, Sweden and Japan.

(a) Information not available.

(b) Including cadmium content of flue dust, etc., exported for treatment.

(d) Estimated cadmium content of shipments of dust to Germany.

CHROMITE.

The mineral chromite (FeO , Cr_2O_3) is the commercial source of the metal chromium; it is also used extensively in the manufacture of refractory brick. The metal is a necessary constituent of many high-speed cutting tools, certain armour plate, and stainless steels. Chromite is also used in the manufacture of chromic acid for electroplating and in the manufacture of chemicals used chiefly in the dyeing, tanning and pigment industries.

The principal chromite producing countries are Russia, South Africa, Turkey, Southern Rhodesia, Cuba, New Caledonia, Yugoslavia, India, and Philippine Islands. Production of the mineral in Canada during recent years has been relatively small, coming almost entirely from the Eastern Townships, Quebec. During the past few years considerable development work was conducted on a chromite deposit located at Obongo Lake, in the Thunder Bay district of Ontario; shipments were made from this property in 1935, 1936 and 1937. The owners of this mine, The Chromium Mining and Smelting Corp. Ltd., also have a modern electric smelting plant at Sault Ste. Marie, Ontario, for the production of ferrochrome and ferrosilicon. No commercial shipments of ore were made from the Obongo Lake property during 1938, and it was reported that the company, in the future, would smelt only imported chromite ore. In 1938 development work was conducted on a chromite deposit located in Matane County, Province of Quebec; some eight tons of ore were extracted during the year, but no shipments were recorded.

In British Columbia, exploration and development work has been conducted during the past on several chromite deposits, but there have been no reports made to the Dominion Bureau of Statistics, Ottawa, of recent activities at these properties with the exception of some surveying completed in 1937 by the Consolidated Mining and Smelting Company of Canada, Limited, at chromite claims located near Ashcroft. The British Columbia department of mines reported that in 1938 a syndicate known as the Calgary Mineral Syndicate employed men in uncovering a supposedly large body of chromite mineralization of good grade on a property located 4 miles west of Ashcroft, B.C. It was later determined that this deposit was considered of doubtful economic importance.

"Metal and Mineral Markets", New York, quoted chrome ore September, 1939, as follows: Per long ton c.i.f. Atlantic ports: 43 to 45 per cent Cr_2O_3 , \$20.00 to \$22.00; 48 to 50 per cent, \$25.00 to \$26.00. Prices nominal.

Table 124.—Production of Chromite in Canada, 1928-1938

Year	Short tons	\$	Year	Short tons	\$
1928.....			1934.....	111	1,578
1929.....	126	900	1935.....	1,144	14,947
1930.....			1936.....	(a)	13,578
1931.....			1937.....	(a)	43,250
1932.....	78	1,113	1938.....		
1933.....	30	343			

(a) Quantity not published.

Production in 1918 was 21,994 tons valued at \$867,122; of this output 670 tons valued at \$36,395 came from Cascade in the Rossland district, British Columbia, and the balance from Quebec province.

Table 125.—Imports of Chromium and Chromium Products into Canada, 1938

	Quantity	\$
Chromium metal and tungsten metal, in lumps, etc., when imported by manufacturers for alloying purposes.....	lb. 43,527	30,328
Nickel chromium in bars or rods not more than 0.75 inches diam. containing 60%+ nickel and 10%+ chromium, for use as electric resistance wire, etc.....	lb. 43,472	41,805
Chrome fire brick.....	\$	47,885
Bichromate of potash—crude.....	lb. 121,531	10,435
Bichromate of soda.....	lb. 1,776,372	106,150
Chrome ore and ores of metals n.o.p.†.....	lb. 19,137,700	378,496
Chrome ore (a).....	lb. 18,206,600	142,399

† To March 31—1938.

(a) From April 1st, 1938; 16,464,000 pounds at \$123,100 from British South Africa.

Table 126.—Consumption of Certain Chromium Products and Chrome Ore in Specified Canadian Industries, 1937 and 1938

Industry	Item	1937		1938	
		Pounds	\$	Pounds	\$
Ingots and Castings.....	Chrome ore.....	1,158,000	20,602	504,000	8,440
Ingots and Castings.....	Ferrochrome.....	1,734,000	167,531	1,473,000	116,639
Paints, Pigments and Varnishes.....	Chrome colours.....	1,470,347	219,073	1,425,687	215,524
Paints, Pigments and Varnishes.....	Sodium bichromate.....	573,267	46,157	490,607	34,837
Leather Tanning.....	Sodium bichromate.....	1,822,343	139,212	1,482,653	115,227
Glass Manufacture.....	Chromite.....	52,000	996	68,000	1,461

NOTE.—In addition to the items listed above, a considerable quantity of chromite is utilized in the manufacture of Canadian ferro-alloys, also a relatively small quantity of sodium bichromate is consumed in the chemical industry. Chromite is also employed in Canada in the manufacture of refractories.

Table 127.—World Production of Chrome Ore, 1937 and 1938

(Supplied by Imperial Institute)

(Long tons)

Producing Country	1937	1938	Estimated Cr ₂ O ₃ content*	
			1937	1938
BRITISH EMPIRE				
United Kingdom.....	300	466	75	117
Sierra Leone (shipments).....	729	497	328	224
Southern Rhodesia.....	271,265	183,083	132,900	89,700
Union of South Africa.....	165,958	173,773	74,349	78,181
Cyprus.....	1,615	5,577	800	2,800
Canada.....	3,814		800	
India.....	62,307	44,149	31,000	22,000
Australia.....	459	952	(a)	(a)
Total.....	506,000	408,000		
FOREIGN COUNTRIES				
Bulgaria.....	2,313	1,717	1,064	687
Greece (b).....	51,789	35,098	21,000	14,000
Italy (Rhode Is.).....	(a)	(a)	(a)	(a)
Norway.....	173	(a)	78	(a)
U.S.S.R. (c).....	(a)	(a)	(a)	(a)
Yugoslavia.....	58,918	49,401	28,000	23,800
Cuba.....	79,420	36,739	22,000	10,000
Guatemala.....		483		(a)
United States.....	2,321	812	1,000	350
Brazil (exports).....	837	920	(a)	(a)
Japan.....	(a)	(a)	(a)	(a)
Philippine Islands.....	75,209	38,271	34,000	18,000
Turkey.....	189,468	210,256	90,000	105,000
New Caledonia.....	47,264	51,391	24,000	26,000
Total.....	(a)	(a)		
World's Total.....	(a)	(a)		

* Only approximate estimates can be given owing to the wide variation in the chromium content of the ore produced in several of the countries concerned.

(a) Information not available.

(b) Figures for 1938 refer to exports.

(c) Probably includes some ore needing concentration.

IRON ORE

No iron ores, known as such, have been mined in Canada for some years. Nova Scotia, with its large iron and steel industry, is not a producer of iron ore. The large deposits of high grade ore in Newfoundland, owned by the Dominion Steel and Coal Corporation, are much more readily accessible and of a higher and more constant grade than the iron ore deposits in Nova Scotia.

Iron ore was first mined and smelted in the province of Quebec early in the eighteenth century, and from that time until 1883, the industry was carried on almost continuously at Three Rivers in the St. Maurice district. Other furnaces using local ore were operated at Radnor Forges and Drummondville, the last to shut down being the Drummondville furnace in 1911. At the present time only titaniferous ore is mined in Quebec; this ore is produced near Baie St. Paul and is shipped for its titanium content.

The following is a copy of Bill No. 45 introduced to the Legislative Assembly of the Province of Quebec, March, 1939:—

AN ACT TO ENCOURAGE THE MAKING, IN THE PROVINCE, OF SULPHUR, STEEL, AND OTHER BY-PRODUCTS OF IRON ORE.

HIS MAJESTY, with the advice and consent of the Legislative Council and of the Legislative Assembly of Quebec, enacts as follows:

1. In this Act:

a. The term "metallic pyrites" means natural minerals containing sulphur and iron, with or without other metals;

b. The term "natural iron ore" means natural oxides and carbonates of iron obtained from iron ore deposits as they occur in nature:

c. The word "unit" means one per cent of metallic iron content contained in the iron oxide recovered from the metallic pyrites after extraction of the sulphur, or in natural iron ores;

d. The word "ton" means 2,240 pounds avoirdupois.

2. "The Lieutenant-Governor in Council may, upon such conditions as he may determine, authorize the payment, during a period of five years to be computed from the first of January, 1940, to any miner or producer of metallic pyrites from deposits situated in the Province, of a premium of two (2) cents per unit of metallic iron contained in each ton of iron ore recovered from the treatment, in the Province, of metallic pyrites, subject to the following condition.

The recovered material, containing iron oxide derived from the treatment of metallic pyrites, must be delivered to and used in plants of the Province which manufacture pig-iron, steel, powdered iron, sponge iron, ferro-alloys or iron in other forms."

3. "The Lieutenant-Governor-in-Council may, in addition, authorize, upon such conditions as he may determine, the payment, during the same period, to miners and producers of natural iron ore mined from deposits situated in the Province, of a premium of two (2) cents per unit of metallic iron contained in every ton of iron ore, subject to the following condition.

The natural iron ore must be delivered direct from the mine or from a concentrating mill to blast furnaces or other plants of the Province, manufacturing pig-iron, iron or steel, and must be treated therein."

4. The determination of the iron content in the iron ore recovered from the metallic pyrites after the extraction of sulphur, and in the natural iron ores, shall be effected, after delivery, on samples of ore dried at a temperature of 212° Fahrenheit.

5. "The Lieutenant-Governor-in-Council may make regulations respecting applications for the payment of premiums and the information and data to be supplied in support of such applications."

6. "The expenditure occasioned through the carrying out of this act shall be paid out of the consolidated revenue fund."

7. The Minister of Mines and Fisheries shall be charged with the carrying out of this act.

8. This act shall come into force on the day of its sanction.

During 1937 the Algoma Ore Properties Limited, commenced rebuilding the surface equipment at the New Helen iron mine in Michipicoten; work was suspended in May, 1938, and resumed in December; development operations have since been continuous and commercial shipments of beneficiated ore were commenced in July, 1939; the Dwight-Lloyd process for the elimination of CO₂ and sulphur is employed in the treatment of the Helen mine ore. A new discovery of hematite iron ore at Steep Rock Lake, near Atikokan, Ontario, the first of bessemer grade ever found in Ontario, was reported in March of 1938. This deposit, which might prove of extreme importance to the industrial life of the province and to Canada generally, has been outlined by diamond-drilling on behalf of the Sterola Exploration Company. Early drilling indicated a mass of ore at least 700 feet long and 150 wide. This grade of hematite ore requires no beneficiation prior to smelting. Exploration of the deposit by diamond drilling was continued in 1939; shaft sinking preparatory to commercial production was also commenced.

Legislation passed by the Ontario Legislature has provided that a bounty of two cents per unit of iron will be paid to possible producers of iron ores for a period of ten years, commencing January 1, 1939.

Different varieties of iron ore are found in various parts of British Columbia, the most important of which are the magnetite deposits which occur on the islands along the coast.

Table 128.—Shipments of Iron Ore from Wabana Mines, Newfoundland, 1929-1938

Year	To Nova Scotia	To United States	To Europe	Total shipments
	Short tons	Short tons	Short tons	Short tons
1929.....	763,168	85,501	850,370	1,699,039
1930*	523,918	54,623	740,774	1,319,315
1931.....	234,148	25,670	530,079	789,897
1932*	.....	.....	166,303	166,303
1933.....	.....	.....	254,383	254,383
1934*	346,178	.....	344,769	690,947
1935.....	611,581	.....	81,123	692,704
1936.....	527,540	12,656	252,676	792,872
1937.....	702,714	50,490	1,242,088	1,995,292
1938.....	555,348	.....	1,305,068	1,860,416

* Shipments to Europe in 1930, 1932 and 1934 were to Germany only, while from 1935 to 1938 shipments went to both Germany and Great Britain. Shipments to Germany in 1938 totalled 1,256,230 short tons.

Table 129.—Imports into Canada and Exports of Iron Ore, 1938

	Quantity	Value
	Short tons	\$
IMPORTS		
Iron ore from the United States.....	631,031	1,538,369
Iron ore from Newfoundland.....	607,025	1,083,817
Iron ore from other countries.....	64,374	208,296
Total.....	1,302,430	2,830,482
EXPORTS—Total.....	209	636

Table 130.—World Production of Iron Ore, 1937 and 1938

(Including Manganiferous Iron Ore)

(Supplied by *Imperial Institute*)

(Long tons)

Producing Country	Ore		Estimated Iron Content	
	1937	1938	1937	1938
BRITISH EMPIRE				
United Kingdom (b).....	14,214,995	11,859,191	4,264,499	3,557,757
Northern Rhodesia.....	520	205	260	100
Sierra Leone (shipments).....	633,985	861,955	361,400	491,300
South West Africa.....	14,054	23,484	6,605	11,038
Union of South Africa.....	454,505	497,336	290,701	314,462
Newfoundland.....	1,609,718	1,680,213	837,000	873,000
Burma.....	25,426	18,050	16,500	12,000
India.....	2,870,832	2,743,675	1,840,000	1,760,000
Federated Malay States.....	1,147	923	(a)	(a)
Unfederated Malay States.....	1,660,342	1,580,915	1,060,000	1,010,000
Australia.....	1,871,631	2,250,491	1,235,000	1,485,000
New Zealand.....	571	1,218	250	540
Total.....	23,360,000	21,520,000		
FOREIGN COUNTRIES				
Austria.....	1,854,927	2,605,000	661,043	900,000
Belgium.....	261,415	(a)	118,000	(a)
Bulgaria.....	11,732	16,506	7,486	9,880
Czecho-Slovakia.....	1,807,490	(a)	589,960	
France.....	37,252,386	32,904,045	13,000,000	11,500,000
Germany.....	9,636,974	10,942,200	2,715,044	3,064,000
Greece.....	295,752	(a)	146,034	(a)
Hungary.....	285,463	364,091	95,716	121,000
Italy.....	1,000,219	989,829	520,000	515,000
Luxemburg.....	7,643,597	5,059,443	2,205,083	1,482,780
Norway.....	992,301	1,400,000	643,754	910,000
Poland.....	767,830	858,369	244,000	265,000
Portugal.....	7,578	(a)	3,012	(a)
Roumania.....	127,022	136,748	57,000	62,000
Spain.....	975,132	2,474,125	460,000	1,160,000
Sweden.....	14,711,555	13,701,955	8,991,129	8,277,616
Switzerland (estimated).....	70,000	150,000	(a)	(a)
U.S.S.R. (d).....	26,000,000	27,000,000	(a)	(a)
Yugoslavia.....	609,713	597,523	305,000	300,000
Algeria.....	2,386,927	2,985,582	1,265,000	1,500,000
Morocco (French).....	65,744	265,547	(a)	(a)
Morocco (Spanish).....	1,402,231	1,320,468	840,719	792,000
Tunis.....	928,858	809,070	471,806	421,857
Cuba (shipments).....	488,420	152,099	220,000	70,000
Mexico.....	133,869	109,920	88,300	71,500
United States (c).....	73,434,520	28,756,142	36,700,000	14,400,000
Brazil.....	182,708	362,690	(a)	(a)
Chile.....	1,505,542	1,581,670	920,000	950,000
French Indo-China.....	32,764	128,240	16,109	70,746
Japan.....	(a)	(a)	(a)	(a)
Korea.....	204,200	(a)	(a)	(a)
Manchuria.....	(a)	(a)	(a)	(a)
Philippine Islands.....	681,698	856,310	382,000	479,534
Turkey.....		19,980		13,290
New Caledonia.....		35,707		18,525
Total.....	190,000,000	144,000,000		
World's Total.....	213,000,000	165,000,000		

(a) information not available.

(b) In addition, bog ore and iron ore (not used for smelting) were produced as follows:—

1937..... 8,243 long tons

1938..... 6,454 long tons.

Iron ore is also produced in China.

(c) Including shipments of manganiferous iron ore up to 35 per cent Mn.

(d) Estimated for 1937 and 1938.

IRON AND STEEL AND THEIR PRODUCTS

The Primary Iron and Steel Industry

Statistics for the Primary Iron and Steel Industry include data for all establishments in Canada which were engaged *chiefly* in the manufacture of (a) pig iron, (b) ferro-alloys, (c) steel ingots and steel castings, (d) hot rolled iron and steel products, (e) cold rolled or cold drawn steel bars, strips and shapes. Forty firms were included in this industry in 1938 and reports were received for 55 different plants or departments, including 4 blast furnace departments, 4 ferro-alloy plants, 31 steel furnace divisions, and 16 rolling or drawing mills. Separate reports were received for blast furnace departments, steel furnace divisions and rolling mills even when they were really units of a single works.

Factory sales of pig iron, ferro-alloys, steel ingots and castings, and finished rolled products were 21 per cent lower in 1938 than in 1937, the values being \$59,606,150 and \$74,580,669, respectively. The 25 works in Ontario reported sales at \$38,116,667, or 64 per cent of the total for Canada; 6 plants or departments in Nova Scotia accounted for \$11,183,267, or 19 per cent, and 14 works in Quebec for \$8,418,130 or 14 per cent. There were also 4 operating plants in Manitoba, 1 in Alberta, and 5 in British Columbia.

Capital employed in 1938 amounted to \$100,272,104, including \$65,986,098 as the value of land, buildings and plant equipment, \$23,814,192 as the value of inventories of raw and finished materials on hand and in process, and \$10,471,814 as the total of operating capital such as cash, bills and accounts receivable, etc. For works in Ontario the capital was \$66,698,135; for Nova Scotia, \$18,746,845; for Quebec, \$12,683,812; for Manitoba, \$1,818,738, and for Alberta and British Columbia, \$324,574.

The average number of employees in 1938 was 13,100, a decrease of 7 per cent from the 1937 average of 14,054. About 889 persons worked in the blast furnace departments in 1938, 295 in ferro-alloy plants, 4,609 in steel furnace divisions, and 7,307 in rolling mills. About 61 per cent of the total, or 7,960 were employed in Ontario, 2,425 in Quebec, 2,222 in Nova Scotia, 371 in Manitoba and 122 in Alberta and British Columbia.

Payments in salaries and wages amounted to \$18,256,627 in 1938, a drop of 8 per cent from the 1937 total of \$19,926,498. Salaries increased to \$2,844,190 from \$2,643,902 and wages paid totalled \$15,412,437 compared with \$17,282,596 paid in 1937.

The cost of manufacturing materials was \$24,786,761 in 1938 compared with \$33,805,631 in 1937, and the cost of fuel and electricity was \$5,529,833 against \$6,934,008, a decrease of 27 per cent for materials and 20 per cent for fuel and power.

PIG IRON

The output of pig iron in 1938 amounted to 705,427 long tons, a decrease of 22 per cent from the 1937 total of 898,855 tons. Production of basic iron was given at 557,578 tons or 79 per cent of the total; malleable iron amounted to 66,761 tons and the foundry grade to 81,088 tons.

Producers' sales of pig iron in 1938 totalled 129,565 long tons valued at \$2,961,639 compared with 225,716 tons at \$5,146,017, a decrease of 43 per cent in quantity and 42 per cent in value.

Imports of pig iron during the calendar year declined to 2,122 long tons from 6,371 tons in 1937 and exports dropped to 10,546 tons from 38,516 tons.

Stocks held by the producers increased to 127,909 tons at the end of 1938 from 112,287 tons at the close of the previous year.

The apparent consumption of pig iron in Canada during 1938, as computed by deducting the exports from the sum of production and imports and allowing for the change in producers' stocks, amounted to 681,381 tons compared with 831,252 tons in 1937 and 678,804 tons in 1936.

Charges to iron blast furnaces during 1938 included 1,234,433 long tons of iron ore, 697,615 short tons of coke, 345,182 short tons of limestone, 66,614 long tons of mill cinder, etc., and 19,123 long tons of scrap.

The four producers of pig iron in Canada have 10 blast furnaces available for use which, if operated at the rated capacity, could produce 1.45 million tons of pig iron per year. Actual production in 1938 at 705,427 tons was about 49 per cent of capacity. Only 6 blast furnaces were used during the year.

FERRO-ALLOYS

Production of ferro-alloys of all kinds in 1938 amounted to 55,926 long tons compared with 82,072 tons in 1937 and 76,284 tons in 1936.

Ferrosilicon was made by 9 different concerns of which 5 recovered small tonnages as a by-product in the manufacture of fused alumina and 4 made various commercial grades as a primary part of their operations. The total quantity made, all grades, in 1938, was 20,705 long tons with silicon content of 7,612 tons.

Spiegeleisen was made by two companies, ferromanganese by one company only, ferrochrome by two concerns, and ferrophosphorus by only one concern.

STEEL INGOTS AND STEEL CASTINGS

Steel production declined 18 per cent to 1,155,190 long tons in 1938 from 1,402,822 tons in the previous year, the output of ingots decreased to 1,103,094 tons from 1,336,228 tons and the production of castings dropped to 52,096 tons from 66,654 tons. Practically all of the ingots were transferred to the producers' rolling mills while most of the castings were made for sale. The factory sales of ingots and castings totalled 43,086 long tons valued at \$7,780,163 compared with 64,907 tons at \$10,616,508 in 1937.

The 31 steel plants which were in operation during 1938 operated 86 furnaces of which 40 were basic open hearth with total rated annual capacity of 1,734,500 long tons, 43 were electric furnaces with total capacity of 252,900 tons, and 3 were converters with total capacity of 2,600 tons. Two steel plants were idle during the year, 1 electric furnace in Ontario and 1 basic open hearth furnace in Alberta, with a combined capacity of about 40,000 tons per year. Steel ingots were made in 9 establishments; 4 made basic open hearth ingots only, 3 made electric ingots only, and 2 made both basic open hearth ingots and electric ingots. Steel castings were made in 27 works; 3 made basic open hearth castings only, 18 made electric castings only, 2 made converter castings only, 3 made both open hearth and electric castings, and 1 made both converter and electric castings.

Steel furnaces in operation in 1938 used 566,893 long tons of pig iron, 667,268 long tons of scrap, 19,286 long tons of ferro-alloys, 74,574 long tons of ore, 106,881 short tons of limestone, 7,128 short tons of fluorspar, 40,540 short tons of dolomite, and 9,219 short tons of magnesite.

ROLLED AND DRAWN STEEL

In 1938 there were 13 hot rolling mills in operation, 1 cold rolling plant and 2 making cold drawn shapes. Nine of these mills were in Ontario, 3 in Quebec, 3 in Nova Scotia, and 1 in Manitoba. One rolling mill in Ontario and 1 in Alberta were idle throughout 1937.

The value of sales from these works amounted to \$46,050,787 in 1938, a decrease of 15 per cent from the corresponding total of \$54,216,950 for 1937. The main items were—hot rolled bars, 192,705 long tons at \$12,295,300; plates, sheets and strips, 173,746 tons at \$13,050,401; rails and rail fastenings, 131,446 tons at \$6,428,732; semi-finished rolled forms, 110,393 tons at \$4,017,170; structural steel, 60,473 tons at \$3,589,905; wire rods 69,245 tons at \$3,075,006; cold rolled and cold drawn bars, 10,892 tons at \$1,133,816; and miscellaneous products (not rolled), \$2,202,765.

The net amount of rolled forms produced in 1938 was 842,854 long tons, including 954 tons of iron and 841,900 tons of steel.

Imports of rolling mill products were valued at \$25,470,444 in 1938 compared with \$44,792,419 in 1937. Shipments from the United Kingdom were worth \$9,037,346, and purchases from the United States were appraised at \$15,327,938.

Table 131.—Provincial Distribution of Active Plants in the Primary Iron and Steel Industry, 1938

Province	Number of firms	Pigiron		Steel ingots and castings		Rolling and drawing mills	Ferro-alloys (a)
		Number of plants	Number of blast furnaces	Number of plants	Number of steel furnaces		
Nova Scotia.....	4	1	3	2	13	3	1
Quebec.....	13	3	7	10	17	3	3
Ontario.....	16	3	7	10	41	9	1
Manitoba.....	3			3	4	1	
Alberta.....	1			1	1		
British Columbia.....	5			5	9		
Canada.....	(b) 40	4	10	31	86	16	4

(a) Not including artificial abrasive plants which made ferrosilicon as a by-product.

(b) Some firms operate in more than one province.

Table 132.—Principal Statistics of the Primary Iron and Steel Industry, 1938

Years	Number of plants	Capital employed	Average number of employees	Salaries and wages	Cost of fuel and electricity at works	Cost of materials at works	Gross selling value of products at works
		\$		\$	\$	\$	\$
Nova Scotia.....	6	18,746,845	2,222	2,901,124	1,227,470	5,708,404	11,183,267
Quebec.....	14	12,683,812	2,425	2,943,864	755,121	3,181,820	8,418,130
Ontario.....	25	66,698,135	7,960	11,756,505	3,353,829	15,380,617	38,116,667
Manitoba.....	4	1,818,738	371	482,560	161,308	395,185	1,473,903
Alberta.....	1	324,574	122	172,574	32,105	120,735	414,183
British Columbia.....	5						
Canada.....	55	100,272,104	13,100	18,256,627	5,529,833	24,786,761	59,606,150

Table 133.—Production of Pig Iron and Sales by the Producers, 1938

Grades	Total tonnage made	Sales	
		Quantity	Income from sales
	Long tons	Long tons	\$
Basic.....	557,578	26,501	604,790
Foundry.....	81,088	62,492	1,419,826
Malleable.....	66,761	40,572	937,023
Total.....	705,427	129,565	2,961,639

Table 134.—Iron Ore, Fuel and Flux Charged to Iron Blast Furnaces, 1934-1938

Years	Imported iron ore	Mill cinder, scale, etc.	Scrap	Coke	Limestone
	Long tons	Long tons	Long tons	Short tons	Short tons
1934.....	718,237	37,043	12,461	415,462	209,104
1935.....	1,039,234	55,269	30,714	577,355	278,469
1936.....	1,218,823	49,091	20,386	672,210	345,622
1937.....	1,604,073	119,910	16,467	890,384	470,549
1938.....	1,234,433	66,614	19,123	697,615	345,182

Table 135.—Imports into Canada and Exports of Pig Iron, 1934-1938

Years	IMPORTS		EXPORTS	
	Long tons	\$	Long tons	\$
1934.....	6,419	108,300	9,221	176,093
1935.....	8,920	143,726	13,759	287,396
1936.....	3,960	74,589	13,904	304,682
1937.....	6,371	144,354	38,516	851,701
1938.....	2,122	62,494	10,546	224,261

Table 136.—Blast Furnaces in Canada, 1936-1938

Names of companies	Location of plants	Number of stacks	Total daily capacity (24 hours)	Number of days in blast		
				1936	1937	1938
			(Long tons)			
Dominion Steel and Coal Corporation Ltd.	Sydney, N.S.....	1	350	366	357	165
		1	300	92		
		1	550	228	363	365
Total.....		3	1,200			
Canadian Furnace Company, Limited.....	Port Colborne, Ont.....	1	350	224	245	193
The Steel Company of Canada, Limited...	Hamilton, Ont.....	1	275	165	365	365
		1	550	366	365	365
Total.....		2	825			
Algoma Steel Corporation, Limited.....	Sault Ste. Marie, Ont.....	1	300			
		1	300			
		1	450	230	365	290
		1	550			
Total.....		4	1,600			
Total for Canada.....		10	3,975			

Table 137.—Production of Ferro-Alloys, 1927-1938

Years	Long tons	Years	Long tons
1927.....	56,230	1933.....	30,133
1928.....	44,842	1934.....	31,921
1929.....	89,116	1935.....	56,616
1930.....	65,223	1936.....	76,284
1931.....	46,764	1937.....	82,072
1932.....	16,161	1938.....	55,926

Imports of ferro-alloys into Canada in 1938 totalled 751 long tons valued at \$263,156; exports included 12,492 long tons of ferro-silicon valued at \$657,359 and 16,866 long tons of ferromanganese and other alloys worth \$648,549.

Table 138.—Production of Steel Ingots and Steel Castings, by Grades, 1934-1938

(Long tons)

Years	Steel ingots		Direct steel castings			Total steel ingots and castings
	Open hearth	Electric	Open hearth	Converter	Electric	
1934.....	713,227	23,891	6,457	507	13,700	757,782
1935.....	872,444	36,742	9,119	645	22,577	941,527
1936.....	1,037,713	43,836	10,208	575	23,447	1,115,779
1937.....	1,274,992	61,236	23,827	1,016	41,811	1,402,882
1938.....	1,047,203	55,891	15,525	759	35,812	1,155,190

Table 139.—Materials Used in Steel Furnaces, 1938

Materials	Quantity	Cost of purchased materials
	Long tons	\$
(a) Metals:—		
Pig iron—Own make.....	555,048	
Purchased.....	11,845	294,086
Sponge iron.....		
Spiegeleisen.....	2,518	86,833
Ferromanganese.....	11,710	614,317
Ferrosilicon.....	3,789	195,271
Ferrochrome.....	739	116,639
Ferrotitanium.....	76	14,547
Ferrotungsten.....	30	69,806
Ferrovandium.....	11	25,324
Other ferro-alloys.....		83,406
Scrap iron and steel—Own make.....	254,073	
Purchased.....	413,195	5,782,857
Metals for making alloy steels—Nickel.....	259	176,534
Other metals.....		214,113
(b) Ores:—		
Crude iron ore, imported.....	74,137	462,773
Calcined, roasted, or treated ore, imported.....	81	774
Manganiferous ore, imported.....	104	1,300
Chrome ore, imported.....	252	8,440
(c) Other Material:—	Short tons	
Limestone—Canadian.....	38,882	64,436
Foreign.....	69,999	59,039
Fluorspar.....	7,128	119,301
Dolomite.....	40,540	137,127
Magnetite.....	9,219	336,811
Coke.....	5,567	46,899
Anthracite coal.....	482	4,036
Bituminous coal.....	94	704
Charcoal.....	19,484	5,880
Electrodes.....		181,981
Moulding sands.....	34,342	182,211
Sand-blast sand.....	1,781	12,215
Firebrick and fireclay.....		521,436
Other materials.....		1,090,738
Total value of metals, ores and other materials used.....		10,909,834

Table 140.—Summary of Steel Furnace Capacity in Canada, 1938

Type of furnace	Number of furnaces	Total rated annual capacity
		(Long tons)
Basic open hearth.....	40	1,734,500
Electric.....	43	252,900
Converter.....	3	2,600
Total.....	86	1,990,000

Table 141.—World Production of Pig Iron and Ferro-Alloys, 1937 and 1938

(Supplied by the Imperial Institute)

(Long tons)

Producing Country	1937	1938	Producing Country	1937	1938
BRITISH EMPIRE			FOREIGN COUNTRIES—Con.		
United Kingdom.....	8,493,100	6,761,100	Netherlands.....	306,849	295,276
Union of South Africa.....	271,887	289,822	Norway.....	178,375	(a)
Canada.....	980,927	758,421	Poland.....	712,857	948,367
India.....	1,629,301	1,570,712	Roumania.....	125,225	128,328
Australia (b).....	947,948	926,678	Spain.....	126,000	432,949
Total.....	12,320,000	10,310,000	Sweden.....	680,721	702,309
FOREIGN COUNTRIES			U.S.S.R. (e).....	14,291,000	14,756,000
Austria.....	381,479	(c)	Yugoslavia.....	39,291	58,326
Belgium.....	3,743,675	2,425,870	Belgian Congo.....	556	(a)
Czecho-Slovakia.....	1,648,609	1,214,500	Mexico.....	88,300	(a)
Finland.....	23,616	(a)	United States.....	37,127,277	19,160,861
France.....	7,759,211	5,965,575	Brazil.....	96,552	116,707
Germany.....	15,707,743	e18,220,130	Japan.....	2,758,858	(a)
Hungary.....	352,282	329,724	Korea.....		(a)
Italy.....	860,497	914,177	Manchuria.....	(a)	(a)
Luxemburg.....	2,472,814	1,526,212	Philippine Islands (estimated)...	200	(a)
			Total (d).....	90,300,000	71,000,000
			World's Total.....	102,500,000	91,000,000

(a) Information not available.

(b) Years ended June 30.

(c) Austria included with Germany from March 15, 1938.

(d) Including an allowance for China.

(e) Excluding ferro-alloys.

Table 142.—World Production of Steel Ingots and Castings, 1937 and 1938

(Supplied by the Imperial Institute)

(Long tons)

Producing Country	1937	1938	Producing Country	1937	1938
BRITISH EMPIRE			FOREIGN COUNTRIES—Con.		
United Kingdom.....	12,984,000	10,397,900	Latvia.....	2,855	2,598
Union of South Africa.....	279,700	294,822	Luxemburg.....	2,470,588	1,413,818
Canada.....	1,402,882	1,155,995	Poland.....	1,428,023	1,526,583
India.....	895,229	936,493	Roumania.....	235,495	270,979
Australia (c).....	1,097,639	1,160,000	Spain.....	165,354	463,361
Total.....	16,700,000	13,900,000	Sweden.....	1,088,141	956,669
FOREIGN COUNTRIES			U.S.S.R.	17,149,000	17,500,000
Austria.....	639,457	(b)	Mexico.....	(a)	72,471
Belgium.....	3,801,586	2,248,600	United States (d).....	50,568,701	28,349,991
Czecho-Slovakia.....	2,254,879	1,710,000	Brazil.....	75,223	88,238
France.....	7,794,997	6,087,902	Japan.....	5,719,488	(a)
Germany.....	19,050,372	(e)22,874,857	Korea.....		(a)
Hungary.....	655,000	(a)	Manchuria.....	(a)	(a)
Italy.....	2,065,582	2,270,961	Total.....	115,600,000	92,000,000
			World's Total.....	132,300,000	106,000,000

(a) Information not available.

(b) Included with Germany from March 15, 1938.

(c) Years ended June 30.

(d) Excluding steel castings which were produced by companies not manufacturing steel ingots.

(e) Includes Austria from March 15, 1938.

LITHIUM

The principal commercial lithium ores are amblygonite, a fluophosphate of lithium and aluminium; spodumene, a silicate of these two elements; and lepidolite or lithia mica, which is also a silicate. The lithia content of these minerals, as mined, commonly ranges around 8 to 9 per cent for amblygonite, 4 to 7 per cent for spodumene, and 3 to 5 per cent for lepidolite. All of the above minerals are known to occur in Canada but there has, as yet, been only a small production, mainly of lepidolite and spodumene. The important deposits are all in Manitoba in the south-

eastern part of the province. The first commercial shipment of Canadian lithium ore to be officially recorded was reported during 1937. This production came from deposits located at Bernic Lake, Manitoba, and was valued at \$1,694; the mineral was consigned to the United States for the manufacture of lithium compounds and possibly lithium metal. No commercial shipments of lithium ores from Canadian mines were reported in 1938. It has been stated that the lepidolite from the silver leaf deposits in Manitoba contains substantial quantities of caesium and rubidium.

"Metal and Mineral Markets", New York, quoted lithium metal, September, 1939, per pound, 98 to 99 per cent 100 pound lots \$15. Amblygonite was quoted, August, 1939, per ton F.O.B. mines 8 to 9 per cent Li_2O \$40. Lepidolite, per ton, \$20 to \$25 for ordinary grades, lump F.O.B. mines.

Statistics relating to possible imports of lithium, lithium ores or lithium compounds are not shown separately in Canadian trade reports.

Table 143.—World Production of Lithium Mica, 1936-1938

(Supplied by the *Imperial Institute*)

(Long tons)

Country	1936	1937	1938
South West Africa.....	852	1,030	.....
Canada.....	.....	(£342)	.....
France.....	400	(a)	(a)
Portugal.....	.....	109	.....
United States (lithium minerals).....	1,108	1,212	796
Argentina.....	60	181	(a)

(a) Information not available.

MAGNESIUM

No magnesium metal has been produced in Canada during recent years. However, in 1918, the manufacture in the Dominion of metallic magnesium was undertaken by the Shawinigan Electro Metals Company Limited at Shawinigan Falls, Quebec, from imported magnesium chloride salts.

The United States Bureau of Mines in its "Minerals Yearbook" for 1939 states:—"Increased interest in aircraft in the present national defence program of the United States has again emphasized the growing importance of magnesium and other light alloys. Production (sales) of primary magnesium in the United States in 1938 was greater than ever before. Outside of the United States production of magnesium increased at an even more rapid rate. World output totalled possibly 22,000 metric tons, an increase of 22 per cent over that indicated in 1937. Germany continued as the outstanding producer, with an estimated output of 12,000 tons. The rapid growth in the use of magnesium abroad is due to the armament and self-sufficiency programs of totalitarian and democratic countries, as well as to development of new uses based upon its lightness and strength. Sales of primary magnesium in the United States in 1938 totalled 2,410 short tons. The 1938 estimate of magnesium production by countries is as follows:—Greater Germany, 12,000; United Kingdom, 2,200; United States (sales) 2,186; Japan 2,000; France 1,800; Switzerland 800; U.S.S.R. 600; and Italy 400. The magnesium chloride electrolytic process continued to supply the greater part of the output. The principal raw materials used were potash final liquor, carnallite, magnesite and brine. It is expected that a larger part of the output will be furnished by the thermal reduction process in 1939 when new plants in the United Kingdom, Japan and Italy are scheduled to begin production. These new plants will use magnesite and dolomite as raw materials.

Data relating to any Canadian imports of magnesium metal are not published separately.

The nominal New York price for 99·8 per cent ingot magnesium remained unchanged at 30 cents per pound, carload lots, throughout 1938, according to the Engineering and Mining Journal.

"Metal and Mineral Markets"—New York—Prices September 21, 1939, were:—per pound ingots (4 x 16 in.) 99·8 per cent; carload lots, 27 cents; extruded sticks, carload lots, 34 cents.

MANGANESE ORE

No commercial production of Canadian manganese ores was reported in 1938. In Nova Scotia an average of seven men were employed at the East Mountain Mine, Colchester County, from February 1 to December 24; considerable underground development work was completed and several hundred tons of ore were raised and stockpiled. The chief interest in New Brunswick manganese deposits in 1938 centred in the holdings of Manganese Limited, located at Gowland Mountain and Turtle Creek, Albert County. Ore has been shipped from both these localities in the past, but no shipments were made in 1938. Twenty claims were staked along the lower part of the Tetagouche river in the vicinity of the Falls, where H. D. Bishop was investigating the possibilities of the manganese deposits operated many years ago. On May 26, 1939, mining operations were resumed at the Turtle Creek manganese deposits, Albert County, New Brunswick.

The Department of Mines and Resources, Ottawa, reports that the manganese ores which have been mined in Canada are pyrolusite, manganite, psilomelane, and bog manganese. These, with the exception of the bog manganese, were mostly ores with a high manganese content and fairly free from deleterious constituents. They were usually in small lots and were derived from various localities in Nova Scotia, New Brunswick and British Columbia.

Although manganese is used in both the ferrous and non-ferrous metallurgical industries, the bulk is consumed in the manufacture of iron and steel. Most of the ore entering this industry is used in the manufacture of ferromanganese and spiegeleisen, the forms in which manganese is usually added to steel. A considerable quantity of manganese ore is used by producers of storage batteries and certain manganese ores are used by the chemical, ceramic, and glass industries.

Engineering and Mining Journal's "Metal and Mineral Markets"—New York quoted manganese ore, August 31, 1939, as follows:—per long unit of manganese, c.i.f. North Atlantic ports, cargo lots, exclusive of duty; Brazilian, 46 to 48 per cent manganese, 27 cents; Chilian, 47 per cent minimum, 27 cents; Indian, 48 to 50 per cent, 28 cents; Caucasian, 52 to 55 per cent, 29 cents; South African, 50 to 52 per cent, 28 cents; 44 to 48 per cent, 24 cents. Nominal Metal and Mineral Markets reported September 21, 1939, that inability to obtain freight room on cargo lots caused sellers to virtually withdraw from the market and prices were wholly nominal. Some Cuban ore was around during the week at 43 cents per long ton unit and on dutiable material nominal quotations ranged from 35 cents to 40 cents, basis 48 per cent; ferromanganese advanced \$20 per ton establishing the market at \$100 per ton on the 78 to 82 per cent grade.

Imports into Canada of manganese oxide during 1938 totalled 21,050 tons valued at \$463,673 compared with 77,227 tons at \$802,269 in 1937. Of the 1938 imports 18,957 tons worth \$371,564 came from the Gold Coast.

Table 144.—Production of Manganese Ore in Canada, 1924-1938

Year	Tons	Value	Year	Tons	Value
		\$			\$
1924.....	584	4,088	1935.....	100	800
1925-1929.....			1936.....	221	1,596
1930.....	273	1,356	1937.....	85	817
1931.....	117	2,893	1938.....		
1932-1934.....					

The total production of manganese ore in Canada since 1886 totalled 15,981 short tons valued at \$455,010. The largest annual tonnage in those years was 1,801 in 1888 and the greatest annual value was \$89,544 for 957 tons produced in 1916.

Table 145.—Consumption of Manganiferous Ore and Manganese Compounds in Specified Canadian Industries, 1937 and 1938

Industry	Item	1937		1938	
		Quantity	Value	Quantity	Value
			\$		\$
Electrical Apparatus and Supplies	Manganese dioxide..... pound	4,207,634	75,970	4,187,176	84,368
Paints, Pigments and Varnishes	Manganese salts..... pound	55,423	6,322	46,396	5,427
Steel Ingots and Castings.....	Ore, manganiferous (foreign) pound	664,000	4,949	227,296	1,300
	Spiegeleisen..... long ton	2,682	88,650	2,518	86,833
	Ferromanganese..... long ton	13,392	629,865	11,710	614,317

NOTE.—In addition to the consumption recorded in the table above, a considerable quantity of manganiferous ore is employed in the manufacture of ferro-alloys.

German imports of manganese ore in 1938, according to the United States Department of Interior, totalled 425,785 metric tons of which 47,769 came from Brazil; 17,226 from British India; 268,044 from British South Africa; 60,925 from Russia and 31,821 from other countries.

Table 146.—World Production of Manganese Ore, 1937 and 1938

(Supplied by the Imperial Institute)

(Long tons)

Producing Country	1937	1938	Estimated Manganese Content	
			1937	1938
BRITISH EMPIRE				
Gold Coast (shipments).....	527,036	324,207	274,000	169,000
Northern Rhodesia.....	2,341	2,735	646	506
Union of South Africa.....	621,229	543,028	264,581	234,914
Canada.....	76		(a)	
India.....	1,051,594	967,929	526,000	484,000
Unfederated Malay States.....	32,793	31,970	9,900	9,600
Australia.....	1,142	594	(a)	(a)
New Zealand.....	5	90	2	40
Total.....	2,240,000	1,870,000		
FOREIGN COUNTRIES				
Bulgaria.....	3,000	1,857	1,200	650
Czecho-Slovakia.....	104,664	(a)	17,641	(a)
Germany.....	177	(a)	74	(a)
Greece.....	6,842	(a)	3,685	(a)
Hungary.....	24,691	21,870	9,800	8,800
Italy.....	33,002	47,529	11,800	15,000
Portugal.....	312	548	135	246
Roumania.....	49,947	59,222	15,000	18,000
Sweden.....	6,031	5,983	2,091	2,131
U.S.S.R. (estimated).....	2,770,000	2,900,000	(a)	(a)
Yugoslavia.....	4,369	3,699	1,500	1,300
Belgian Congo.....	30,498	7,603	15,249	3,800
Egypt.....	183,377	150,694	53,179	45,000
Morocco (French).....	75,257	85,230	35,000	40,000
Morocco (Spanish).....	650	150	247	60
Costa Rica (exports).....	129	299	(a)	(a)
Cuba.....	113,840	(c) 110,523	(a)	(a)
Mexico.....	17	116	(a)	(a)
Porto Rico (exports).....	2,343	1,023	1,171	512
United States (b).....	40,241	25,321	20,800	11,400
Argentina.....	596	(a)	250	(a)
Brazil.....	256,054	218,455	120,000	103,000
Chile.....	12,809	(a)	5,764	(a)
French Indo-China.....	5,207	2,179	2,300	1,096
Japan.....	(a)	(a)	(a)	(a)
Netherlands East Indies.....	10,908	9,534	6,000	5,000
Philippine Islands.....	5,600	40,240	2,700	18,900
Portuguese India.....	4,013	9,478	1,766	4,200
Turkey.....	522	2,151	130	1,027
Total.....	3,800,000	3,900,000		
World's Total.....	6,000,000	5,800,000		

Manganese ore is also produced in Spain and China.

(a) Information not available.

(b) Shipments. Excluding the following quantities of ore containing 10 to 35 per cent Mn, which are recorded by the United States Bureau of Mines as iron ore:—

1937..... 151,955 long tons
1938..... 33,620 "

(c) Exports.

MERCURY

Commercial production of mercury in Canada during 1938 was reported at 760 pounds with an estimated value of \$760. The output of the metal during the year under review came entirely from the property of the Empire Mercury Mines Limited, Mud Creek, Lillooet Mining Division, British Columbia. Mining operations were conducted by the company from July 1 to December 31 and the mill was operated intermittently from September, 1938, to February, 1939. During 1938 work of a prospecting nature was conducted at a Cinnabar property located on Pinchi Lake, Omineca Mining Division, British Columbia. Production as recorded for 1938 was the first commercial output to be reported in Canada since 1897. A small output of mercury in Canada in 1895, 1896 and 1897 was derived from deposits located at the western end of Kamloops Lake, B.C. These deposits consist of quartz veins containing pockets of Cinnabar, in a zone of decomposed tertiary volcanic rocks.

Imports of mercury into Canada in 1938 totalled 49,584 pounds valued at \$49,564 compared with 394,354 pounds at \$371,178 in 1937. Of the 1938 imports 10,008 pounds came from the United Kingdom; 31,276 pounds from the United States and 8,300 pounds from Italy.

"Metal and Mineral Markets", New York, quoted mercury—per flask of 76 pounds \$77 to \$78—January, 1939—\$150 to \$160 September, 1939, nominal.

Table 147.—Imports of Mercury into Canada for Years Specified

Year	Pounds	\$	Year	Pounds	\$
1912.....	137,474	72,171	1917.....	71,608	76,322
1913.....	219,442	109,493	1918.....	56,936	68,903
1914.....	204,229	97,449	1937.....	394,354	371,178
1915.....	184,432	159,184	1938.....	49,584	49,564
1916.....	79,204	74,461			

Table 148.—Mercury Consumed in Specified Canadian Industries, 1937 and 1938

Industry	1937		1938	
	Pounds	Value	Pounds	Value
		\$		\$
Boiler compounds.....	300	304		
Medicinal and pharmaceutical preparations.....	44,574	41,399	12,666	10,249
Other chemicals.....	55,994	47,552	22,305	19,767

NOTE.—In addition to the consumption specified, there is a considerable quantity of quicksilver employed by the mining industry in the recovery of both placer and lode gold.

Table 149.—World Production of Mercury, 1937 and 1938

(Supplied by the *Imperial Institute*)
(Lb.)

Producing Country	1937	1938	Producing Country	1937	1938
BRITISH EMPIRE			FOREIGN COUNTRIES—Con.		
Canada.....		760	Algeria.....	9,429	15,252
Australia.....	710		Tunis.....	1,911	20,536
New Zealand.....	1,344	760	Mexico.....	375,132	647,490
FOREIGN COUNTRIES			United States.....	1,254,608	1,367,316
Austria.....	10,192	(a)	Bolivia (exports).....	1,217	(a)
Czecho-slovakia.....	208,989	220,000	China (exports).....	131,925	4,941
Italy.....	4,868,000	5,073,000	Japan.....	(c) 44,000	(c) 45,000
Roumania.....	293	(a)	Korea.....		
Spain (b).....	3,200,000	3,200,000	Turkey.....	37,269	45,408
			World's Total.....	10,100,000	10,600,000

Quicksilver is also produced in Germany and U.S.S.R.

(a) Information not available.

(b) Figures are the amounts imported from Spain by the chief consuming countries.

(c) Estimated.

MOLYBDENITE

Molybdenite ore is the chief source of the metal molybdenum, the mineral, a soft steel-blue coloured sulphide, is usually found in pegmatite dykes and along the contacts of limestone and gneiss. The metal is employed chiefly in the manufacture of special alloy steels.

Production of molybdenite concentrates in Canada during 1938 totalled seven tons valued at \$4,500. This output came from the Zenith Mine located in Bagot Township, Renfrew County, Ontario. In the Province of Quebec development or prospecting work in 1938 on molybdenite deposits was reported near Maniwaki by the Maniwaki Molybdenum Mines Limited, at Quyon by the Quyon Molybdenite Company Limited and in North Western Quebec (Malartic Area) by the Molybdenite Corporation of Canada Limited. In addition to the operations conducted by the Zenith Molybdenite Corporation Limited in Renfrew County, Ontario, work of a prospecting nature on molybdenite properties located in Lyndoch and Raglan townships of the same county was reported by McCoy Molybdenite Limited. It was also reported that a relatively small shipment of molybdenum ore was made in 1938 from Loon Station on the C.P.R. in Western Ontario; however, no official data from the producers of this ore were obtainable. The only other Canadian molybdenite property officially reported as active in 1938 was the "Stella Group" located in the Omineca Mining Division, 7 miles southwest of Endako, British Columbia; operations at this property in 1938 consisted of assessment work only.

During the first six months of 1939 the properties of the following mining firms were reported as active: Quyon Molybdenite Limited; Zenith Molybdenite Corporation Limited; Regenergy Metals (Hawk Junction Algoma District, Ontario); Edgemont Mines Limited (Raglan Township, Renfrew County, Ontario) and A. Langly (Stella Group, B.C.).

According to the United States Bureau of Mines, the United States supplied 33,297,000 pounds (92.5 per cent) of the record world output of 36,000,000 pounds of molybdenum in 1938. The Climax mine of the Climax Molybdenum Company in Colorado is the principal producer of molybdenum, having furnished about 78 per cent of the world output and 85 per cent of the United States output in 1938; the company in 1938 mined 4,344,734 short tons of ore containing 0.606 per cent MoS_2 from which 27,591 short tons of concentrates containing 28,242,085 pounds of molybdenum were recovered.

For most purposes molybdenite (MoS_2) is converted, before using, to ferromolybdenum or to calcium molybdate (a compound resulting from the roasting of molybdenite with lime and containing 35 to 45 per cent molybdenum). The latter, states the U.S. Bureau of Mines, is the cheaper method of preparing molybdenum for industrial applications. Molybdenum oxide in briquets is also used in making molybdenum additions to iron and steel. Improved processes of heat-treating and fabricating high-speed tool steels in which part of the tungsten has been replaced by molybdenum have increased the use of molybdenum in this field.

The only data published as relating to Canadian imports of molybdenum are those pertaining to calcium molybdate. Calcium molybdate imported into Canada during 1938 by manufacturers of steel for use exclusively in the manufacture of steel in their own factories totalled 181,377 pounds valued at \$63,131 compared with 212,566 pounds worth \$70,337 in 1937. Imports during both years came entirely from the United States. Imports into Canada of alloys used in the manufacture of steel or iron n.o.p. totalled 1,227,100 pounds valued at \$241,409 in 1938; some of these may have contained molybdenum.

"Metal and Mineral Markets", New York, quoted molybdenum ore, January, 1939—per pound of contained MoS_2 , 90 per cent concentrate, 45 cents, f.o.b. mines, London, per long ton unit, nominal at 43s. to 44s. for 85 to 90 per cent concentrate. Molybdenum metal per pound in 10 to 49 pound lots C.P. powder \$9.50; 99 per cent \$2.60 to \$3.00. Ferro-molybdenum:—per pound of Mo, f.o.b. shipping point, 55 to 65 Mo, 95 cents; Molybdate, per pound of contained Mo, 80 cents.

Table 150.—Production of Molybdenite in Canada, 1925-1938

Year	Ores treated	Ores and concentrates shipped		MoS ₂ content of shipments
	Tons	Tons	Value (a)	Pounds
			\$	
1925.....	2,779	15.3	11,176	22,350
1926.....	4,490	12.6	10,472	20,943
1927.....				
1928.....				
1929.....	2,900	9.5	6,400	16,150
1930.....				
1931.....	12	0.61	280	1,222
1932-1936.....				
1937.....	5,307	8.25	8,147	(b)
1938.....	(b)	6.5	4,500	(b)

(a) Value as given by the operators.

(b) Not known.

Table 151.—World Production of Molybdenum Ore, 1937-1938

(Supplied by *Imperial Institute*)

(Cwt.)

Producing Country	1937	1938	Producing Country	1937	1938
BRITISH EMPIRE			FOREIGN COUNTRIES—Con.		
Canada.....	147	140	Norway (<i>MoS₂ content</i>).....	11,279	(a)
Burma.....	14		French Morocco (<i>MoS₂ content</i>)...	3,200	3,350
Australia.....	1,400	1,163	Mexico (<i>MoS₂ content</i>).....	20,655	15,861
FOREIGN COUNTRIES			United States (<i>MoS₂ content</i>).....	437,783	495,492
Italy (<i>MoS₂ content</i>).....	15	4	Peru (<i>MoS₂ content</i>).....	1,629	3,006
Roumania (<i>Bi-Mo Ore</i>).....	530	3,230	Japan.....	(a)	(a)
			Korea.....	(a)	(a)
			Turkey (<i>MoS₂ content</i>).....	720	1,540

Molybdenum ore is also produced in Yugoslavia and China.

(a) Information not available.

RADIUM-URANIUM

Commercial production of radium-uranium bearing ores in Canada is confined, at the present time, entirely to the Great Bear Lake district in the Northwest Territories. Eldorado Gold Mines Ltd. operates a mine and mill at Echo Bay, Great Bear Lake, Northwest Territories, and Bear Exploration and Radium Limited conducted mining and milling operations in 1938 at Contact Lake in the same district. Pitchblende concentrates produced by the Eldorado Company are treated for the recovery of radium and uranium at a refinery owned and operated by the company at Port Hope, Ontario. Important quantities of silver and some copper also occur with the pitchblende at the Eldorado mine and these metals, in the form of concentrates, are shipped principally to the metallurgical works of other firms for the recovery of the silver and copper content.

The property of Bear Exploration and Radium Limited was active throughout the year and 3,058 tons of ore were milled; shipments of silver-bearing concentrates were made by this company to the Trail smelter of Consolidated Mining and Smelting Company of Canada Limited and to the refinery of the Eldorado Gold Mines Limited.

Eldorado gold Mines Limited reported that during 1938 there were 27,770.2 tons of ore treated in the mill. From this was sorted 1,754.8 tons of waste and 40.2 tons of high grade pitchblende, silver and cobalt. Concentrate production consisted of 643.0 tons pitchblende-silver; 74.7 tons silver-copper; 26.0 tons cobbed pitchblende-silver and 14.0 tons cobbed cobalt. These various concentrates were valued by the company at \$1,546,005 in radium, uranium and silver content. The refinery of the company located at Port Hope, Ontario, worked during the 12 full months of 1938; during the year there were 557 tons of concentrates received from the mine

and the company reported that the total value of finished products amounted, at current market values, to \$1,200,000. Recovery of silver was fully completed on the 600 tons entered, of uranium on 520 tons, of radium on 514 tons. All the silver produced was sold in the form of silver sulphide. Enough radioactive lead was recovered to meet the demand. The procedure of recovery has been altered to obtain finally the lead and the radium D in the form of oxide and chloride in a more economical manner. Production of black oxide of uranium was again more than double the production of the previous year.

For statistical purposes, the data relating to the mining and milling and the refining of pitchblende-silver ores in Canada are combined, respectively, with those of silver-lead-zinc mining and non-ferrous smelting industries. Figures pertaining to production of radium and uranium in Canada are not published.

The Union Minière du Haut Katanga is the world's other large producer of radium but little information is available regarding the mining of radium ores by this organization in the Belgian Congo or to the refining operations conducted at Oolen, Belgium. The following information relating to radium production by the Union Minière du Haut Katanga is taken from a special publication issued recently by that organization:—

"Uranium ore of a high radium content was discovered some years ago at Shinkolobwe in the Katanga.

"A plant was built at Oolen, Belgium (Société Générale Métallurgique de Hoboken) for the treatment of the ore.

"The first grammes of radium were produced in 1922, and the annual output has been regulated since by the world demand.

"The Oolen plant caters to the greatest part of the world demand for radium.

"The ores of the Katanga are mostly all derived from pitchblende of which the varieties are numerous and distinguishable by their green, yellow and orange colours. They are mostly chalcocite or tobernite (copper phosphouranate), curite (lead uranite), kasolite (lead silico-uranate), etc.

"The radium content of these ores is exceedingly variable, but that of the ores of the Katanga is very high comparatively to the radium content of similar ores produced elsewhere. It has determined a substantial lowering of the sale price of radium.

"The Union Minière has made available without charge important quantities of radium to the hospitals of the four Belgium universities and to several other scientific organizations in order to aid them in their researches".

A December, 1938, issue of the Mining Journal, London, included the following information relating to the recent Radium Marketing Agreement:—"With reference to the agreement concluded recently between the Union Minière du Haut Katanga and the Eldorado Company, by which 60 per cent of the world market is allotted to the former and 40 per cent to the latter over a period of five years, Lloyd Anverso points out that the Joachimstahl Concern, now German, whose production in 1937 did not exceed 5 grammes, is not included in the arrangement".

In March, 1939, the United States Consul Frankfort-on-Main announced that the Auer-gesellschaft A.G., of Berlin, Germany's leading manufacturer of radioactive materials, has obtained a concession from the German Government to operate under lease the radium-ore mines at St. Joachimstahl. The Auer Company will mine the ore, smelt it, and finally, in its modern works at Berlin, extract the radium; the entire output will doubtless be used in Germany.

Radium is employed chiefly for therapeutic use with lesser quantities being used in the manufacture of radioactive paints, soaps, etc. The radium paints are utilized principally for watches and clocks and for numerous navigation instruments for ships, aircraft, etc. Radium is also employed in the detection of flaws in heavy metallic bodies.

Uranium marketed chiefly as black uranium oxide and yellow and orange sodium uranate is employed in the ceramic industry largely for the production of desired shades in the body and glaze. A hard ternary alloy containing copper and uranium is now made in the United States; it is claimed that the alloy affords improved performance and longer life to current-carrying or heat-carrying members of electrical machinery.

Imports of radium into Canada during 1938 were valued at \$22,559 compared with \$6,402 in 1937. Data relating to Canadian exports of radium and imports and exports of uranium are not shown in Canadian Government Publications.

“Metal and Mineral Markets”, New York, quoted radium September, 1939,—per mg. radium content \$25 to \$30, as to quantity. September, 1939, New York quotations for uranium were—black oxide kgs. \$2.65-per pound; yellow kgs. \$1.75 per pound.

Radium salts are marketed usually in the form of implants in gold or platinum needles containing 1 to 12½ mg. or in sealed tubes of glass, silver, or platinum containing 10 to 100 mg. Radon or emanation ordinarily is sold in gold implants or seeds.

Table 152.—World Production of Uranium Minerals, 1937 and 1938
(Supplied by the Imperial Institute)
(Cwt.)

Producing Country	1937	1938
BRITISH EMPIRE		
Canada.....	(b)	(b)
FOREIGN COUNTRIES		
Czechoslovakia (U ₃ O ₈).....	217	(a)
Portugal (U ₃ O ₈).....	(c)	(a)
United States (U ₃ O ₈).....	219	544

Uranium minerals are also produced in U.S.S.R. and the Belgian Congo.

(a) Information not available.

(b) The production of radium and uranium salts were:—

	Radium grams.	Uranium salts Lb.
1936.....	15,541	211,857
1937.....	23,770	546,000

(c) The content of radium in salts was 2,900 mgrams.

SELENIUM

Selenium production in Canada represents a by-product in the electrolytic refining of blister and anode copper made from Saskatchewan, Manitoba, Ontario, and Quebec ores. It is recovered at Copper Cliff, Ontario, by the Ontario Refining Company, Ltd., and at Montreal East, Quebec, by the Canadian Copper Refiners, Ltd.

One of the principal uses for selenium is as a decolorizer in the manufacture of glass. It is used with cadmium sulphide as a pigment and with sulphur as a secondary vulcanizing agent in the rubber industry. Selenium is used in copper alloys and stainless steel to increase machinability. Selenium is marketed chiefly as a black to steel-gray amorphous powder, also in cakes and sticks.

Prices of selenium remained nominally unchanged throughout 1938 at \$1.75 to \$1.85 a pound for the standard 99.5 per cent black powdered variety in New York. Barium selenide, BaSeO³ is quoted in glass-trade Journals at \$1.40 to \$1.60 a pound, while the “commercial” grade (25 per cent Se) stands at 85 cents.

Table 153.—Production of Selenium in Canada, 1931-1938

Year	Pounds	\$	Year	Pounds	\$
1931 (a).....	21,500	40,850	1935.....	366,425	703,536
1932.....			1936.....	350,857	621,017
1933.....	48,221	70,345	1937.....	397,227	687,203
1934.....	104,924	171,311	1938.....	358,929	622,742

(a) First commercial production in Canada.

In 1937 the Canadian glass industry consumed 4,116 pounds of selenium valued at \$7,565. Consumption in the same industry in 1938 totalled 3,186 pounds worth \$5,711. Complete data on world production of selenium and tellurium are not available.

TELLURIUM

As with selenium, the metal was recovered in Canada as a by-product in the electrolytic-refining of anode copper at Montreal East, Quebec, by Canadian Copper Refiners, Limited, and at Copper Cliff, Ontario, by the Ontario Refining Company, Limited. The production in Ontario represents the recovery of the metal solely from nickel-copper ores, whereas at Montreal East the metal originated in copper-gold ores mined in Manitoba, Saskatchewan, and Quebec.

Tellurium is used in rubber hose and cable coverings and greatly increases the toughness and abrasion resistance of rubber. Tellurium is usually marketed as slabs and sticks of 99 per cent purity, but for use in compounding rubber it is furnished in the form of a steel gray powder. The metal is also used to harden, toughen and increase the corrosion resistance of lead. Both tellurium and selenium impart free-cutting properties to alloy and plain carbon steels.

Table 154.—Production of Tellurium in Canada, 1934-1938

Year	Pounds	\$	Year	Pounds	\$
1934*	5,130	25,599	1937	41,490	71,777
1935	16,425	32,850	1938	48,237	82,967
1936	35,591	62,997			

* First commercial production in Canada.

TIN

Tin is known to occur in the Snowflake and Sullivan mines in British Columbia and in certain pegmatites in southeastern Manitoba. It has also been reported at New Ross, Nova Scotia. No tin ore deposits have been worked or tin ore production recorded in Canada during recent years. The Nova Scotia Department of Public Works and Mines reported that some prospecting was performed in 1938 by Mr. George Mitchell on an occurrence of molybdenum and tin in the New Ross Area, Lunenburg County.

Table 155.—Imports of Tin and Tin Products into Canada, 1938

Item	Pounds	\$
Tin in blocks, pigs or bars*	5,275,200	2,205,449
Tinfoil	19,092	6,593
Collapsible tubes		45,484
Tin bichloride and tin crystals	129,053	28,407
Oxide of tin and copper	165,006	54,039
Phosphor tin and phosphor bronze in blocks, bars, plates, etc.	595,098	158,137
Tin plate food containers		282,206
Tin plate containers, n.o.p.		346,671
Sheets, plate, hoop, etc., tin coated	155,976,500	8,814,995
Manufactures of tin plate painted, etc., manufactures of tin, n.o.p.		505,833
Kitchen or dairy hollow-ware or iron or steel coated with tin		38,312
Arseniate, biarseniate and stannate of soda	11,200	2,843

* Of the 1938 imports 3,378,400 pounds valued at \$1,400,871 came from the Straits Settlements and 1,730,000 pounds at \$730,772 from United Kingdom.

Exports of tinware from Canada in 1938 were appraised at \$13,481.

Table 156.—Available Statistics on the Consumption of Tin in Specific Canadian Manufacturing Industries, 1936-1938

Industry	Item (used)	1936	1937	1938
		Pounds	Pounds	Pounds
Brass and Copper Products	Ingots	276,414	384,685	269,050
	Scrap	12,290	7,540	11,736
	Other	3,583	2,774	13,225
	Pig	2,940,320	3,207,124	2,756,326
Iron and Steel and Their Products*	Tin	1,144,865	1,324,562	1,400,000

* Includes castings and forgings; boilers, tanks and engines; farm implements; machinery; hardware and tools; sheet metal products; wire; railway rolling stock; heating and cooking apparatus; automobile parts, etc., partly estimated 1936 and 1937.

The average New York spot price for Straits tin in 1938 was 42.301 cents.

Table 157.—Apparent Tin Consumption of the World, 1937-1938, by Countries, in Long Tons (1)

Country	1937	1938
Belgium.....	1,520	1,618
Canada.....	2,625	2,355
Czechoslovakia.....	1,731	1,560
France.....	9,175	9,049
Germany (2).....	12,392	13,474
India, British.....	2,595	2,494
Italy.....	3,584	4,618
Japan.....	8,190	10,963
Netherlands.....	1,470	1,400
Poland.....	1,272	1,819
Spain.....	942	1,082
Sweden.....	1,897	2,895
Switzerland.....	1,100	1,259
United Kingdom.....	25,971	18,290
U.S.S.R.....	25,125	16,174
United States.....	86,663	50,724
Other countries.....	12,448	11,826
	198,700	151,600

(1) As estimated by the Tin Research and Development Council.

(2) Includes Austria; the Saar is also included after February 17, 1935.

Table 158.—World Production of Tin Ore, 1937 and 1938

(In terms of metal)

(Supplied by the *Imperial Institute*)

(Long tons)

Producing Country	1937	1938	Producing Country	1937	1938
BRITISH EMPIRE			FOREIGN COUNTRIES		
United Kingdom.....	1,987	1,999	Germany.....	(a)	(a)
Nigeria.....	10,782	7,305	Italy.....	60	5
Northern Rhodesia.....	5	3	Portugal.....	1,095	1,036
Southern Rhodesia.....	139	267	Belgian Congo.....	8,133	9,025
South West Africa.....	169	164	Cameroon (French).....	258	242
Swaziland.....	108	122	Morocco (French).....	14	.....
Tanganyika Territory.....	243	241	Mozambique.....	6	(a)
Uganda (exports).....	361	399	Mexico.....	373	249
Union of South Africa.....	538	558	United States.....	168	109
Burma.....	4,636	4,412	Argentina.....	1,423	(a)
Federated Malay States.....	75,117	41,206	Bolivia (exports).....	25,128	25,484
Unfederated Malay States.....	2,075	2,041	Peru.....	173	103
Straits Settlements.....	72	114	China (smelter).....	11,100	11,600
Australia.....	3,256	3,329	French Indo-China.....	1,577	1,599
			Japan.....	2,300	2,300
			Netherlands East Indies.....	39,165	27,299
			Siam.....	15,786	14,704
Total.....	99,000	62,000	Total.....	107,000	95,000
			World's Total.....	206,000	157,000

NOTE.—In the case of countries for which assay figures are not published the metal content of the ores has been estimated on the following percentages—South West Africa 70, Swaziland 70, Uganda 70, Burma 70, Belgian Congo 70, Japan 70, Siam 72.

(a) Information not available.

TITANIUM

Ilmenite, the titanium ore so largely employed in the manufacture of pigments, is known to occur at several places in Canada and commercial shipments of the mineral have been made during past years from deposits located at St. Urbain and Ivry in the province of Quebec. During 1938, Canadian production came entirely from St. Urbain, Quebec, and totalled 207 short tons valued at \$1,449; the mineral was consigned to the United States.

Paul M. Tyler of the U.S. Bureau of Mines refers to the current uses of titanium as follows:— 'Although pigments continue to represent the chief outlet for ilmenite, other fields of use are not being neglected. In metallurgy titanium is not only an effective deoxidizer and cleansing agent, but an alloying element as well. By addition of titanium, chrome-nickel steels are made more resistant to corrosion and chrome-molybdenum steels become easier to weld. In aluminium and sundry non-ferrous alloys, titanium refines the grain and otherwise contributes to better structure. A variety of low carbon as well as high and medium carbon alloys are now available, in addition to the older alloys that first found extensive application only for treating sheet steel and rails. To avoid employing expensive alloys W. Mathesius has patented (British) a process for introducing titanium into molten steel by carbon reduction from a cover slag. In welding-rod coatings, the principal function of rutile is to stabilize the ore, though it also tends to prevent the inclusion of oxides and nitride needles in the deposited metal.'

Imports into Canada of antimony oxide, titanium oxide and white pigments containing not less than 14 per cent by weight of titanium totalled 4,710,481 pounds valued at \$512,219 in 1938 compared with 5,630,451 pounds at \$526,745 in 1937. Of the 1938 imports 1,599,659 pounds came from the United Kingdom and 4,110,672 pounds from the United States. No imports into Canada of titanium ore or rutile were recorded in 1938.

United States quotations for titanium ore January, 1939, were:—Per gross ton, ilmenite, 45 to 52 per cent TiO_2 , F.O.B. Atlantic seaboard \$10 to \$12, according to grade and impurities. Rutile, per pound, guaranteed minimum 94 per cent concentrate, 10 cents, nominal; 88 to 90 per cent, \$55 per ton, C.I.F. New York ferrocantitanium per ton \$142.50 F.O.B. producer's plant.

Table 159.—Production of Titanium Ore in Canada*, 1927-1938

Year	Short ton	\$	Year	Short ton	\$
1927.....	2,029	8,980	1933.....		
1928.....	2,244	6,732	1934.....	2,023	14,161
1929.....	2,748	7,359	1935.....	2,288	16,400
1930.....	412	1,239	1936.....	2,566	18,318
1931.....	1,509	10,261	1937.....	4,229	26,432
1932.....			1938.....	207	1,449

* All from Quebec.

Table 160.—Consumption of Titanium Pigments in Canadian Paint Industry, 1931-1938

Year	Pounds	Cost at works	Year	Pounds	Cost at works
		\$			\$
1931.....	745,207	89,761	1935.....	2,513,026	261,506
1932.....	691,304	96,759	1936*	2,456,265	269,130
1933.....	1,061,249	128,969	1937*	3,748,341	362,869
1934.....	1,710,188	186,678	1938*	3,903,337	378,548

* In 1936 includes 1,396,337 pounds of pure titanium white valued at \$193,638. In 1937 the quantity of pure titanium white totalled 1,299,857 pounds valued at \$193,107 and in 1938, 1,341,359 pounds at \$200,552.

NOTE.—Neither titanium white nor titanium alloys are commercially produced in Canada.

In 1938 there were 76 tons of ferrotitanium valued at \$14,547 consumed in the manufacture of steel in Canada.

Table 161.—World Production of Titanium Minerals, 1937 and 1938

(Supplied by the Imperial Institute)

(Long tons)

Producing Country and Description	1937	1938	Producing Country and Description	1937	1938
BRITISH EMPIRE			FOREIGN COUNTRIES		
South West Africa—			Norway—		
Rutile.....	16		Ilmenite.....	66,270	(a)
Canada (shipments)—			Rutile.....	184	(a)
Titaniferous iron ore.....	3,776	185	Portugal—		
Federated Malay States (exports)—			Ilmenite.....	1,433	559
Ilmenite.....	6,252	6,462	Cameroon (French)—		
India—			Rutile.....	101	116
Ilmenite.....	181,047	252,220	Egypt.....	315	89
Australia—			Senegal—		
Ilmenite.....	670	(a)	Ilmenite.....	3,026	8,303
Rutile.....	1,123	(a)	Brazil (exports)—		
Rutile-ilmenite.....	72	(a)	Ilmenite.....	230	312
			Rutile.....	644	211

NOTE.—Titanium minerals are also produced in the United States, but figures are not available for publication. In recent years, however, the production of ilmenite has varied between 1,000 and 5,000 tons, and the production of rutile has been several hundred tons.

(a) Information not available.

TUNGSTEN

The Bureau of Mines, Ottawa, states that occurrences of tungsten-bearing minerals, usually in the form of scheelite, are known in Nova Scotia, New Brunswick, Manitoba, British Columbia, and in the Yukon Territory.

The only important production of tungsten ore in Canada reported previous to 1918 is that of 1912, being 14 tons of concentrates produced by the Scheelite Mines Limited, of Moose River, Nova Scotia. In 1915 the British Government commandeered all supplies of tungsten concentrates within the Empire at a fixed price of 55 shillings (\$13.50) per unit (22.4) pounds of contained tungstic acid.

In 1917 a small test shipment of a few hundred pounds was made from Halifax County, Nova Scotia, and another from Dublin Gulch, Mayo District, Y.T., amounting in all to 580 pounds running 69.41 per cent WO_3 and netting \$234. The production in 1918 amounted to $13\frac{1}{2}$ tons valued at \$11,700 and with a metallic content of 19,915 pounds of WO_3 . This production consisted of 11 tons of concentrates shipped to New York by the Acadia Tungsten Mines Limited, operating at Burnt Hill, New Brunswick, with also a few small consignments to the Mines Branch Testing Plant, Ottawa, from Nova Scotia, Manitoba and the Mayo district, Yukon. A concentrating mill was erected in 1912 by the Scheelite Mines Limited, operating the Moose River Properties in Nova Scotia and in 1916 a concentrating mill was erected at Burnt Hill, N.B. by the Acadia Tungsten Mines Company. The Burnt Hill mines were inspected in 1917 for the Munitions Resources Commission, Ottawa, and it was then reported that there was some tonnage of wolframite ore, but that the operators could not afford to produce concentrates at the official British price of 55 shillings per unit.

Scheelite was discovered near Falcon Lake, Eastern Manitoba, in March, 1918, and operations were carried on in the district during the year by a new company, the War Metals Production Company Limited. In 1918 it was also reported that the Cariboo Chisholm Creek Mining Company Limited, Van Winkle, B.C., had been operating the old deposit on Hard-scrabble Creek in the Cariboo District.

The Nova Scotia Department of Public Works and Mines reported the Indian Path Tungsten Mines Limited carried out a small amount of work in 1938 on their property at Indian Path, Lunenburg County. This work consisted of unwatering No. 2 shaft and underground workings for exploration purposes. Material taken from ore zones was stated to contain considerable scheelite. No commercial shipments were reported.

In British Columbia the Columbia Tungstens Company Limited carried on both surface and underground development operations during 1938 at the Hardserabble mine located 5 miles N.W. of Wells in the Cariboo Mining Division. In May the power-house, pilot mill and adjoining buildings were destroyed by fire and rebuilding was commenced during the summer. Some 300 tons of tungsten ore were raised in 1938 and it was reported that commercial shipments were commenced by the company in the summer of 1939.

It is also interesting to note that tungsten is reported to occur with gold in the veins of the Slave Lake Gold Mines Limited property, Outpost Island, Slave Lake, Northwest Territories; it is stated that recent sampling of the mine revealed encouraging tungsten values.

The principal use for tungsten is in the manufacture of high-speed tool steels. It is also employed in certain non-ferrous alloys and special alloy steels. Tungsten carbide cemented with cobalt is used extensively in industry and recent developments include several special grades, including combinations of tungsten carbide and tantalum carbide cemented with cobalt or nickel or both, also combinations of tungsten carbide and titanium carbide cemented with cobalt. Tungsten is also utilized in the making of lamp filaments, radio tube filaments and contact points in electrical apparatus; in the chemical industry it is employed in the manufacture of certain types of dyes (lakes), and mordants.

China has been the principal world producer of tungsten ores and the production in that country has been adversely affected by the Sino-Japanese War. Exports in 1938 were 13,387 metric tons (60 per cent WO_3 basis) compared with 17,895 tons in 1937 according to the U.S. Bureau of Mines. It was reported early in 1939 that the Chinese Government had granted to the Peiping Syndicate, Limited, exclusive selling rights for chinese tungsten ore, including the stocks in Hong Kong.

Output in Burma comes principally from the Herminggi and Mawchi mines. The ore reserves of the Mawchi mine are said to contain 3.24 per cent tin and tungsten; exports from Burma in 1938 were 10,598 metric tons.

Table 162.—Imports into Canada of Specified Tungsten Products, 1937-1938

	1937		1938	
	Quantity	\$	Quantity	\$
Tungsten carbide*.....				720
Chromium metal and tungsten metal (a)..... (lb.)	122,288	96,900	43,527	30,328
Metallic elements and tungstic acid for lamps.....		128,781		71,730

* From November 12, 1938.

(a) In lumps, powder, scrap alloy, etc., for alloying purposes.

Table 163.—Tungsten Wire Used in the Manufacture of Canadian Electrical Apparatus and Supplies, 1931-1938

Year	Value	Year	Value
	\$		\$
1931.....	79,659	1935.....	52,192
1932.....	53,802	1936.....	47,856
1933.....	48,701	1937.....	52,768
1934.....	48,996	1938.....	50,594

In 1938 there were 30 tons of ferrotungsten valued at \$69,806 consumed in Canada in the manufacture of steel.

Table 164.—World Production of Tungsten Ore and Concentrates, 1937 and 1938

(Supplied by the *Imperial Institute*)

(Long tons)

Producing Country	1937	1938	Estimated WO ₃ Content	
			1937	1938
BRITISH EMPIRE				
United Kingdom—				
Concentrates.....	127	218	83	152
Nigeria—				
Concentrates.....	8	48	5	31
South West Africa—				
Wolfram.....	28	36	19	25
Scheelite.....	9	8	5	5
Southern Rhodesia—				
Concentrates.....	246	299	160	194
Tanganyika Territory—				
Wolfram.....	2	3	1	2
Uganda—				
Wolfram.....	1	1	1	1
Union of South Africa—				
Tungsten ore.....	34	110	25	75
Burma—				
Concentrates.....	4,998	5,343	3,249	3,473
Federated Malay States—				
Wolfram.....	27	29	19	20
Scheelite.....	836	573	602	412
India—				
Concentrates.....	13	10	8	6
Unfederated Malay States—				
Wolfram.....	242	289	157	187
Australia—				
Wolfram.....	726	979	472	636
Scheelite.....	12	40	8	26
New Zealand—				
Concentrates.....	24	46	16	30
FOREIGN COUNTRIES				
France—				
Tungsten ore.....	1	21		13
Italy—				
Tungsten ore.....	5	7	2	3
Norway—				
Wolfram.....	3	(a)	2	(a)
Portugal—				
Concentrates.....	1,776	2,381	1,190	1,603
Tin-tungsten ores.....	90	138	33	57
Sweden—				
Tungsten ore.....	136	195	75	108
Egypt—				
Tungsten ore.....	176	(a)	(a)	(a)
Morocco (French)—				
Tungsten ore.....		6		4
Mexico.....	30	69	20	45
United States—				
Concentrates.....	3,125	2,718	1,875	1,631
Argentina—				
Concentrates.....	752	(a)	520	(a)
Bolivia (exports)—				
Concentrates.....	1,774	2,490	1,064	1,494
Brazil (exports)—				
Tungsten ore.....	7	2	4	1
Chile—				
Concentrates.....	4	(a)	3	(a)
Peru—				
Concentrates.....	70	(b)157	17	(b) 100
China (exports)—				
Ore.....	16,257	12,163	10,567	7,906
French Indo-China—				
Concentrates.....	571	879	383	571
Japan—				
Scheelite.....	(a)	(a)	(a)	(a)
Korea—				
Ore.....	1,900	(a)	1,230	(a)
Netherlands East Indies—				
Concentrates.....				
Siam—				
Concentrates.....	89	227	58	147

Tungsten ores are also produced in U.S.S.R. and Spain.

(a) Information not available.

(b) Exports.

VANADIUM

Some of the magnetites of the Rainy River district in Ontario are known to contain relatively small quantities of vanadium and some research has been conducted as to its economic recovery. There is no production of either the metal or its ores in Canada at the present time.

The principal occurrences of vanadium are in Arizona, Colorado and Utah in the United States; Minasragra in Peru; Broken Hill in Northern Rhodesia; and Grootfontein district in South West Africa.

The metal is employed chiefly in the manufacture of alloy steels and irons. It is also used in the form of ammonia meta-vanadate as a catalyst in the manufacture of sulphuric acid and in the non-ferrous, glass, ceramic and color industries.

Table 165.—World's Production of Vanadium Ores, 1937 and 1938

(Supplied by Imperial Institute)

Long tons

Producing Country	1937	1938
BRITISH EMPIRE		
Northern Rhodesia.....	232	368
South West Africa.....	583	549
FOREIGN COUNTRIES		
Mexico.....	44	177
United States.....	485	720
Peru (exports).....	1,024	1,451

ZIRCONIUM

The metal is not produced in Canada; zircon is the most common zirconium mineral and the Department of Mines and Resources, Ottawa, states that it, or cyrtolite, commonly occurs in greater or less amount in Canadian Precambrian pegmatites, also in the pegmatitic apatite-phlogopite deposits of the Grenville areas in Ontario and Quebec.

Zirconium ores imported into the United States in 1937 rose to 17,868,139 pounds valued at \$129,576. Of these, Australia supplied 14,913,380 pounds valued at \$77,897, the remainder being divided almost equally between Brazil and British India.

"Mineral Industry" states—"Zirconium wire is used in radio tubes and sheet metal in spinneret cups for rayon manufacture. Zirconium-silicon and zirconium-ferrosilicon are finding a growing use in steel making and zirconium powder is used in flashlight mixtures and in ammunition primers; from a tonnage standpoint, however, the main uses of zirconium compounds are in enamels and for electrodes or welding-rod coatings, as a scavenger for oxides and nitrides in steel, and as a refractory."

According to Industrial and Engineering Chemistry, zirconium is used successfully in the form of zircon and sodium zirconium silicate in enamel and glaze frits, to produce opacity; as zirconium oxide it is used as a smelt in the frit and more recently as a mill addition opacifier.

Imports into Canada of zirconium silicate in 1938 were appraised at \$1,847 while those of zirconium oxide in the same period were valued at \$24,983 compared with \$32,668 in 1937. Data relating to possible imports of zirconium alloys are not published.

Zirconium alloy was quoted by "Metal and Mineral Markets", January, 1939,—12 to 15 per cent zirconium, 39 to 43 per cent silica, \$97.50 to \$102.50 per gross ton; 35 to 40 per cent zirconium, 47 to 52 per cent silica, 14 to 16 cents per pound. Zircon ore per ton, 55 per cent ZrO_2 , F.O.B. Atlantic seaboard, carload lots, \$55; 5 ton lots, \$60. Crude granular zircon, \$70, F.O.B. Suspension Bridge, New York; milled \$90.

Table 166.—Principal Statistics* of the Miscellaneous Metal Mining Industry in Canada, 1937 and 1938

	1937	1938
Number of firms.....	15	19
Capital employed (a)..... \$	1,320,012	1,380,035
Number of employees—On salary.....	20	39
On wages.....	101	90
Total.....	121	129
Salaries and wages—Salaries..... \$	25,628	37,216
Wages.....	129,563	108,335
Total.....	155,191	145,551
Value of products (gross)..... \$	86,040	8,909
Cost of fuel and electricity.....	15,668	10,749
Process supplies used.....	17,466	6,131
Smelter charges.....		
Freight.....	251	26
Value of production (net)..... \$	52,655	—7,997

(*) Does not include data relating to smelters and refineries or to mining in the Northwest Territories.

(a) Exclusive of ore reserves.

Table 167.—Capital Employed in the Miscellaneous Metals Mining Industry in Canada, 1938

	\$
Capital employed as represented by:—	
(a) Present cash value of the land (excluding minerals).....	950,054
(b) Present value of buildings, fixtures, machinery, tools and other equipment.....	364,100
(c) Inventory value of materials on hand, ore in process, fuel and miscellaneous supplies on hand.....	23,868
(d) Inventory value of finished products on hand.....	600
(e) Operating capital (cash, bills and accounts receivable, prepaid expenses, etc.).....	41,413
Total.....	1,380,035

Table 168.—Employees, Salaries and Wages in the Miscellaneous Metal Mining Industries in Canada, 1938

	Number of employees		Salaries and wages
	Male	Female	\$
Salaried employees—			
Total.....	33	6	37,216
Wage-earners—			
Surface.....	67		108,335
Underground.....	20		
Mill.....	3		
Total.....	90		108,335
Grand Total.....	123	6	145,551

Table 169.—Average Number of Wage-Earners Employed, by Months, 1937-1938

	1937	1938		
		Surface	Under-ground	Mill
January.....	125	29	25	2
February.....	123	26	32	1
March.....	93	40	24	2
April.....	103	59	24	
May.....	105	37	13	
June.....	76	71	19	1
July.....	96	62	16	4
August.....	121	55	18	4
September.....	129	67	16	4
October.....	97	112	15	6
November.....	79	133	13	4
December.....	57	126	10	5

CHAPTER SIX

THE NON-FERROUS SMELTING AND REFINING INDUSTRY IN CANADA

The Non-Ferrous Smelting and Refining Industry, as defined by the Dominion Bureau of Statistics, Ottawa, comprises those firms engaged primarily in the smelting of non-ferrous ores or concentrates and the refining of metals recovered therefrom.

The value added by the industry in the processing of crude or semi-crude material during 1938 totalled \$87,091,374 compared with the all-time high record of \$101,807,865 in the preceding year. Refined products included gold, silver, copper, lead, zinc, aluminium, cobalt, cadmium, selenium, tellurium, radium salts, uranium compounds and sulphur; other end products of individual plants or companies were copper-nickel matte, cobalt salts, nickel salts, nickel and cobalt oxides, arsenious oxide, sulphuric acid, platinum metals residues, silver sulphide, silver-lead-bismuth bullion, zinc dust, zinc oxide, blister and anode copper and copper matte.

The cost of ores, concentrates and other material treated during 1938 was estimated at \$173,070,377 as against a corresponding value of \$191,303,251 in 1937; fuels and purchased electricity consumed totalled \$15,233,547 and the value of chemicals and various other process supplies used amounted to \$11,900,435.

Capital employed by the industry in 1938 was reported at \$184,337,126, which figure includes value of land, plant, materials on hand and in process, finished products and operating funds. Employees totalled 12,788 and salaries and wages paid aggregated \$19,549,963 compared with 11,570 and \$17,990,947, respectively, in 1937.

Primary commodity price indexes showed considerable recessions compared with manufactured goods indexes during 1938. The average annual Canadian prices for the major non-ferrous metals copper, lead and zinc were all considerably lower than in the preceding year. However, the improved industrial situation combined with heavy re-armament orders had an especially stimulating effect on base metals during the latter months of the year. The average price of silver in 1938 showed relatively little change from 1937, while the average price of gold in Canadian funds realized an increase of 18.5 cents per fine ounce.

In 1938 the capacity of Canadian Copper Refiners Ltd., refinery at Montreal East, Quebec, was increased by 6,000 tons of copper to a total of 81,000 tons per annum and plans were in course of preparation to provide for a total refining capacity of approximately 100,000 tons of copper a year.

During 1938 the Noranda Smelter, located at Noranda, Quebec, treated 1,291,692 tons of ore, concentrate and refinery slag and produced 99,139,734 pounds of anodes; the estimated production of new metals was 96,966,169 pounds of fine copper, 337,024 ounces of gold and 975,623 ounces of silver; these figures include the production from 221,498 tons of customs ore and concentrate; the estimated recovery from Horne mine ores being 76,358,442 pounds of fine copper, 299,033 ounces of gold and 607,447 ounces of silver.

At Arvida, Quebec, both the ore and reduction plants of the Aluminum Company of Canada Limited were in continuous operation throughout 1938; in the ore plant bauxite ore concentrates were made from crude ore imported from British Guiana, while in the Arvida reduction plant these bauxite concentrates were consumed in the production of aluminum ingot. At Shawinigan Falls, Quebec, the other reduction plant of the same company was operated during the entire year; aluminum ingot was manufactured in this plant chiefly from bauxite concentrates made at Arvida.

The International Nickel Company's smelter at Copper Cliff, Ontario, produced 182,904 tons of bessemer matte and 158,912 tons of converter copper in 1938. The Coniston smelter of the same company was operated continuously, processing 822,906 tons of ore and producing 48,608 tons of bessemer matte; the Port Colborne nickel refinery of the company produced 124,233,682 pounds of refined nickel. The Copper Cliff refinery of the Ontario Refining Co. Ltd. received 158,793 tons of converter copper, transferred in a molten state from the Copper Cliff smelter and produced 145,141 tons of refined copper. At Deloro, Ontario, the Deloro

Smelting and Refining Co. Ltd. treated silver-cobalt ores from northern Ontario, while at Port Hope, Ontario, the Eldorado Gold Mines Limited recovered radium, uranium and silver from argentiferous pitchblende ores mined in the Northwest Territories.

The ore-dressing plant, mill and smelter of Falconbridge Nickel Mines Limited operated at full capacity throughout the year. Ore treated totalled 490,938 tons and 14,779.1 short tons of matte was produced, containing 8,012.7 short tons of nickel and 4,108.5 short tons of copper.

In Manitoba the Flin Flon smelter of the Hudson Bay Mining and Smelting Company Limited smelted a total of 335,834 tons of Flin Flon mine concentrates and ore and 58,003 tons of custom concentrates and ore; there were shipped 42,527 tons of blister copper containing gold, 132,340 ounces; silver, 2,061,163 ounces; copper, 84,095,070 pounds; selenium, 101,686 pounds and tellurium, 11,658 pounds. There was treated in the Flin Flon zinc plant a total of 109,166 tons of zinc concentrates from which was produced for sale 76,827,172 pounds of slab zinc; metallic cadmium production for the year amounted to 188,796 pounds.

Once again in 1938 new all-time records were made in ore extracted from the Sullivan mine of the Consolidated Mining and Smelting Company of Canada Limited. Production of the company at Trail, British Columbia, in 1938 was as follows: lead, 201,574 tons; zinc, 149,071 tons; copper, 850 tons; gold, 56,951 ounces; silver, 9,815,434 ounces; cadmium, 255 tons; sulphuric acid, 134,469 tons; and sulphur and fertilizer, 170,108 tons.

Table 167.—Capital Employed in the Non-Ferrous Smelting and Refining Industry in Canada, 1938

	\$
Capital employed as represented by—	
(a) Present cash value of the land (excluding minerals).....	6,354,398
(b) Present value of buildings, fixtures, machinery, tools and other equipment.....	116,998,155
(c) Inventory value of materials on hand, ore in process, fuel and miscellaneous supplies on hand.....	28,092,893
(d) Inventory value of finished products on hand.....	6,655,128
(e) Operating capital (cash, bills and accounts receivable, prepaid expenses, etc.).....	26,236,552
Total.....	184,337,126

Table 168.—Principal Statistics of the Non-Ferrous Metallurgical Industry in Canada, 1937 and 1938

	1937	1938
Number of companies.....	10	10
Number of plants.....	13	13
Capital employed.....	\$ 162,696,595	184,337,126
Number of salaried employees.....	1,003	1,063
Salaries.....	\$ 2,575,849	2,612,284
Number of wage-earners.....	10,567	11,725
Wages.....	\$ 15,415,098	16,937,679
Value of plant products (gross) (†).....	\$ 318,278,251	287,295,733
Estimated cost of ores, concentrates, etc., treated (a).....	\$ 191,303,251	173,070,377
Cost of fuel and purchased electricity (b).....	\$ 14,607,421	15,233,547
Process supplies other than items (a) and (b).....	\$ 10,559,714	11,900,435
Value added by smelting (net).....	\$ 101,807,865	87,091,374

(†) The gross value of production should not be interpreted as the ultimate sale value of finished metal only, as it represents the combined values of all industry (smelting, refining, etc.) end products (blister, copper matte, etc.), and in this sense is a duplication of values.

Table 169.—Number of Wage-Earners, by Months, 1937 and 1938

Month	1937	1938
January.....	9,814	11,677
February.....	9,842	11,707
March.....	9,966	11,830
April.....	10,153	12,089
May.....	10,458	12,052
June.....	10,814	11,934
July.....	11,047	11,814
August.....	11,172	11,744
September.....	11,031	11,594
October.....	10,895	11,525
November.....	10,868	11,377
December.....	10,749	11,250
Average.....	10,567	11,725

Table 170.—Capacities of Canadian Copper Smelting and Refining Works, 1938 (a)

Company	Blast Furnaces		Reverberatories		Converters	
	Number	Annual capacity—tons of ore and concentrates	Number	Annual capacity—tons of ore and concentrates	Number	Annual capacity—tons of ore and concentrates
Consolidated Mining & Smelting Co. of Canada Ltd. (b).....			1	75,000	2	16,000
Falconbridge Nickel Mines Ltd.....	1	275,000			3	25,000
Hudson Bay Mining & Smelting Co. Ltd.....			1	420,000	2	
Noranda Mines Ltd.....			2	1,060,000	4	230,000
International Nickel Co. of Canada, Ltd.....	4	800,000	7	2,800,000	24	

(a) American Bureau of Metal Statistics.

(b) Idle.

ELECTROLYTIC COPPER REFINERIES

Annual Capacity,
short tons

Canadian Copper Refiners Ltd.....	81,000
Ontario Refining Company, Ltd.....	120,000

The copper refining capacity of the world, covering both electrolytic and furnace methods, at the end of 1938, was summarized by The American Bureau of Metal Statistics as follows, in short tons:

United States.....	1,642,000	Scandinavia.....	25,000
Canada.....	201,000	Other Europe†.....	200,000
South America.....	400,000	Asia.....	120,000
Germany.....	270,000	Africa.....	97,000
Great Britain.....	255,000	Australia.....	45,000
		Total.....	3,255,000

† Exclusive of Russia.

Table 171.—Lead Smelting Capacity of Canada, 1938

Company	Situation of plant	Number of blast furnaces	Annual capacity (tons of charge)
Consolidated Mining & Smelting Co. of Canada, Ltd.....	Trail, B.C.....	5	700,000

LEAD REFINING CAPACITY IN CANADA, 1938

Company	Annual capacity for refined lead
Consolidated Mining & Smelting Co. of Canada, Ltd., Trail, B.C.....	200,000 short tons

LEAD REFINING CAPACITY OF THE WORLD, 1938

(American Bureau of Metal Statistics)

The lead refining capacity of the world, as at the end of 1938, aggregated about 1,072,000 short tons in the United States and about 2,173,000 elsewhere, a grand total of about 3,245,000 tons.

Probably not more than 950,000 tons of the listed capacity in the United States and 1,550,000 tons elsewhere, a total of 2,500,000 tons, is to be rated as useful and effective, the remainder being obsolete, incapable of economical ore supply, or otherwise useless. These accountings are exclusive of capacity of Russia, and also of a few thousand tons in Greece.

Table 172.—Capacity and Production of Electrolytic Zinc Plants in Canada, 1936-1938

Company	Maximum H.P. used	Estimated annual capacity for cathode zinc (short tons)	Actual production as ingot zinc (short tons)		
			1936	1937	1938
Consolidated Mining & Smelting Co. of Canada, Ltd.....	(a) 72,000	(b) 146,000	119,478	124,157	133,242
Hudson Bay Mining & Smelting Co. Ltd.....	21,750	43,000	32,219	34,486	38,414

NOTE.—This statement supplied by the American Bureau of Metal Statistics.
(a) Expressed as power in terms of direct current after transforming the alternating current in sub-station at works.
(b) Capacity for ingot zinc may be reckoned at 95% capacity for cathode deposition.

The American Bureau of Metal Statistics estimates the capacity of American zinc metallurgical works at the end of 1938 as being nominally for the production of about 600,000 short tons of spelter per annum by distilling, including the capacity in continuously operating vertical retorts, and about 210,000 tons by electrolysis, a total of about 810,000 tons, but the first-class effective capacity is probably something less than that. The effective capacity outside the United States, at the end of 1938, was estimated at about 1,200,000 metric tons, whereof about 280,000 tons was in Australia, Canada and Mexico, and about 920,000 tons elsewhere. The estimate of 1,200,000 tons for foreign plants is exclusive of plants in Russia.

CHAPTER SEVEN

THE COAL MINING, COKE, NATURAL GAS, PEAT AND PETROLEUM INDUSTRIES
(Fuels) IN CANADA

The Coal Mining Industry in Canada

The Coke and Gas Industry in Canada

The Peat Industry in Canada

The Petroleum Industry in Canada

1. Production of Crude Petroleum
2. Production of Petroleum Products

NOTE.—In order to correlate data regarding fuels in Canada, this chapter has been prepared to include statistics of the coal, natural gas, peat and petroleum industries. This survey presents information regarding these industries as a whole, dealing principally with the mineral industry, although supplementary data are shown for closely allied manufacturing operations.

The Bureau issues an annual report on Coal Statistics for Canada which may be referred to for complete details of the Coal Mining Industry.

THE COAL MINING INDUSTRY

The Canadian output of coal in 1938 amounted to 14,294,718 tons worth \$43,982,171 compared with 15,835,954 tons at \$48,752,048 in the preceding year and 15,229,182 tons valued at \$45,791,934 in 1936. Bituminous coal production in 1938 totalled 10,329,782 tons, sub-bituminous coal, 488,915 tons and lignite coal, 3,476,021 tons.

A 14·1 per cent decline was recorded in the Nova Scotia output in 1938 when 6,236,417 tons were produced as against 7,256,954 tons in 1937. New Brunswick operators mined 342,238 tons in 1938; during the preceding year 364,714 tons were produced. Production from Manitoba mines amounted to 2,016 tons in 1938. Saskatchewan's output in 1938 was 2·6 per cent lower at 1,022,166 tons. During the year under review, Alberta produced 5,251,233 tons, consisting of 2,310,479 tons of bituminous coal, 488,915 tons of sub-bituminous coal and 2,451,839 tons of lignite coal. The Alberta output in 1937 was made up of 2,413,784 tons of bituminous coal, 506,260 tons of sub-bituminous coal and 2,642,795 tons of lignite coal. A 10 per cent falling-off was shown in the British Columbia production in 1938 compared with the previous year; the totals were, 1,440,287 tons and 1,598,843 tons, respectively. Yukon produced 361 tons of coal in 1938; in the previous year 84 tons were mined.

Exports of Canadian coal in 1938 amounted to 353,181 tons as against 355,268 tons in 1937. Clearances through Prince Edward Island, Nova Scotia, New Brunswick, Quebec and Ontario ports rose to 207,644 tons; on the other hand, exports through the western ports declined 3·5 per cent to 145,537 tons. From April 1, 1937, Canadian coal sold for bunkering purposes has been excluded from the export records. Foreign coal re-exported from Canada in 1938 aggregated 116,322 tons.

Canada imported 13,284,296 tons of coal in 1938 compared with 15,815,032 tons in the previous year and 13,735,166 tons in 1936. Receipts of anthracite coal during the year under review totalled 3,714,001 tons made up of 1,973,610 tons from the United States, 1,199,131 tons from Great Britain, 407,031 tons from Germany, 37,594 tons from the Netherlands, 34,182 tons from Belgium, 27,856 from French Indo-China, 19,645 tons from Morocco and 14,952 tons from Russia. Great Britain supplied 32·3 per cent of Canada's anthracite requirements in 1938; 31·8 per cent a year ago and 46·5 per cent in 1934. Anthracite coal from the United States supplied 53·1 per cent of the Canadian requirements during the year; 55·8 per cent in 1937 and 51·0 per cent in 1934. Imports of bituminous coal aggregated 9,567,334 tons or 21·8 per cent below the 1937 total of 12,241,270 tons. The year's supply of bituminous coal was obtained from the following sources: the United States, 98·9 per cent, Great Britain, 0·7 per cent and Germany and Japan the remainder. Importations of lignite coal from the United States amounted to 2,961 tons in 1938.

Canadian coal mines furnished employment, on the average, to 25,767 wage-earners in 1938; the previous year's average was 25,890 men. Nova Scotia and New Brunswick mines employed 14,712 wage-earners and the western mines, 11,055 men. Workers on the surface averaged 236 days work in 1938 while those underground averaged 200 days. In addition to these men, there were 1,307 salaried employees on the mine pay-rolls. Salaries and wages paid to all employees working in or about the Canadian coal mines during the year under review amounted to \$28,699,781; a year ago employees in this industry received \$31,641,679.

Canada's coal supply, computed on the basis of production plus imports less exports, amounted to 27,225,833 tons in 1938, or 13 per cent below the tonnage made available in 1937. These figures represent the actual tonnages available to Canadian consumers but, do not represent the quantity consumed during the year. The total amount of coal reaching the Canadian market in 1938 was estimated at 25,812,728 tons.

The Canadian fuel requirements are not all supplied by coal; in addition, coke, natural and artificial gas, fuel oil, wood and electricity are used for industrial and domestic purposes. Coke made available for use in Canada in 1938 totalled 2,602,368 tons compared with 2,951,059 tons in the preceding year. Canadian producers sold 863,306 tons of coke in 1938 for domestic use; 702,038 tons were used in metallurgical works operated by producing companies; 232,334 tons were used by coke plants as fuel or to make water gas; 426,375 tons were sold for other uses and about 128,000 tons were added to stocks. There was a 0.7 per cent decline in the imports of coke made from coal; the 1938 total was 414,682 tons while in the preceding year, 417,733 tons were imported. Coke and gas manufacturers in Canada used 1,008,895 tons of Canadian coal and 2,219,119 tons of imported coal during the year under review.

Petroleum coke production in 1938 totalled 64,009 tons and imports amounted to 81,294 tons while exports were recorded at 25,408 tons. The consumption of this coke for domestic heating in 1938 was estimated at 51,684 tons; in addition, 667 tons were used for industrial heating. Stocks on hand at fuel dealers, distributors, importers' storage and at refineries totalled 109,095 tons on January 1, 1938 and 94,040 tons on December 31, 1938.

Manufactured gas production during the year consisted of 34,360,225 cu. ft. from by-product ovens and 8,572,496 M cu. ft. from gas plants. Thirty-five per cent of this quantity of 15,198,068 M cu. ft. was sold; most of the remainder was used as a fuel in the producing plants or their associated metallurgical works. These figures do not include 41,232 M cu. ft. of Pintsch oil gas used for lighting railway cars, 6,486,618 M cu. ft. of still gas recovered and used at petroleum refineries, nor iron blast furnace gas and some producer gas which was recovered and used by producers but for which no records are available.

In 1938, natural gas consumption in Canada consisted of 19,400,000 thousand cubic feet for domestic purposes and 14,045,000 thousand cubic feet for industrial use. It is estimated that the domestic consumption of natural gas during the year resulted in an apparent displacement of 776,000 tons of coal.

Fuel and gas oils made available for use in Canada in 1938 amounted to 592.7 million imperial gallons compared with 563.8 million gallons in 1937. A survey made by the Department of Mines and Resources shows that the Canadian consumption of fuel oil in 1938 was made up as follows: for domestic and building heating, 119 million imperial gallons; for industrial use, 164 million imperial gallons; for bunkering purposes, 175 million imperial gallons; for railways, 51 million imperial gallons and for tractor fuel, 27 million imperial gallons. A possible coal displacement of 788,079 tons was indicated by the quantity of fuel oil used for domestic heating in 1938.

Table 173.—Capital Employed in the Coal Mines of Canada, by Provinces, 1937 and 1938

Province	1937				1938			
	Capital employed as represented by				Capital employed as represented by			
	Cost of lands, buildings, machinery and tools	Cost of supplies and stocks on hand	Cash trading and operating accounts and bills receivable	Total	Cost of lands, buildings, machinery and tools	Cost of supplies and stocks on hand	Cash trading and operating accounts and bills receivable	Total
	\$	\$	\$	\$	\$	\$	\$	\$
Nova Scotia.....	41,604,785	3,365,312	5,163,041	50,133,138	35,928,287	3,575,722	5,077,169	44,581,178
New Brunswick...	935,121	32,419	341,229	1,308,769	628,675	33,159	217,532	879,366
Manitoba.....	4,000	100	500	4,600	4,000	100	500	4,600
Saskatchewan....	2,701,973	76,394	340,960	3,119,327	2,752,658	75,299	261,512	3,089,469
Alberta.....	30,935,737	953,018	6,567,237	38,455,992	30,005,646	652,481	6,542,583	37,200,710
British Columbia.	22,566,174	553,593	1,929,005	25,048,772	23,146,576	466,636	1,923,352	25,536,564
Yukon.....	203,000	250	.....	203,250	203,000	250	.....	203,250
Canada.....	98,950,790	4,981,086	14,341,972	118,273,848	92,668,842	4,803,647	14,022,648	111,495,137

Table 174.—Employees, Salaries and Wages in the Coal Mines of Canada, by Provinces, 1938

Province	Average number of employees				Salaries and wages			
	Salaried employees		Wage-earners		Total	Salaries	Wages	Total
	Male	Female	Surface	Under-ground				
						\$	\$	\$
Nova Scotia.....	444	54	2,132	11,460	14,090	936,855	13,676,617	14,613,472
New Brunswick....	35	5	253	867	1,160	77,562	742,884	820,446
Manitoba.....	.....	.....	.....	5	5	.....	4,186	4,186
Saskatchewan....	58	9	256	585	908	116,802	610,475	727,277
Alberta.....	498	27	1,954	5,420	7,899	1,143,859	7,852,897	8,996,756
British Columbia..	167	10	912	1,921	3,010	447,488	3,089,466	3,536,954
Yukon.....	.....	.....	.....	2	2	.....	690	690
Canada.....	1,202	105	5,507	20,260	27,074	2,722,566	25,977,215	28,699,781

Table 175.—Wage-earners Employed and Days' Work Done, by Months, in the Coal Mines of Canada, 1938, with Comparative Totals for 1937

Month	Number of wage-earners			Days' work done		
	Surface	Under-ground	Total	Surface	Under-ground	Total
January.....	5,891	22,431	28,322	125,013	414,641	539,654
February.....	5,847	22,023	27,870	115,045	382,048	497,093
March.....	5,554	20,295	25,849	111,580	342,970	454,550
April.....	5,108	18,679	23,787	91,337	265,183	356,520
May.....	5,081	18,268	23,349	96,778	317,138	413,916
June.....	4,996	17,935	22,931	93,744	298,361	392,105
July.....	5,058	18,004	23,062	90,540	260,451	350,991
August.....	5,200	19,097	24,297	103,584	295,629	399,213
September.....	5,536	20,064	25,600	107,194	325,966	433,160
October.....	5,944	21,861	27,805	122,974	391,990	514,964
November.....	5,974	22,395	28,369	124,347	395,955	520,302
December.....	5,888	22,065	27,953	119,777	357,248	477,025
Total for 1938.....				1,301,913	4,047,580	5,349,493
Total for 1937.....				1,441,102	4,654,218	6,095,320

Table 176.—Output of Coal in Canada, by Grades, 1929-1938

Calendar year	Bituminous		Sub-Bituminous		Lignite		Total		Average value per ton
	Short tons	Value	Short tons	Value	Short tons	Value	Short tons	Value	
		\$		\$		\$		\$	
1929.....	12,859,822	49,995,261	668,702	1,908,954	3,968,033	11,160,955	17,496,557	63,065,170	3.60
1930.....	10,824,839	41,789,061	603,358	1,705,236	3,453,127	9,355,451	14,881,324	52,849,748	3.55
1931.....	8,861,360	33,165,730	471,343	1,211,197	2,910,508	6,830,755	12,243,211	41,207,682	3.37
1932.....	7,714,279	28,073,744	560,902	1,329,316	3,463,732	7,714,635	11,738,913	37,117,695	3.16
1933.....	7,979,283	27,757,150	554,118	1,274,017	3,369,943	6,892,795	11,903,344	35,923,962	3.02
1934.....	10,058,782	34,356,274	537,508	1,256,936	3,213,903	6,432,732	13,810,193	42,045,942	3.04
1935.....	9,748,841	33,150,781	566,425	1,410,926	3,572,740	7,401,403	13,888,006	41,963,110	3.02
1936.....	10,796,135	36,256,347	566,235	1,432,741	3,866,812	8,102,846	15,229,182	45,791,934	3.00
1937.....	11,634,379	39,661,259	506,260	1,314,196	3,695,315	7,776,593	15,833,954	48,752,048	3.08
1938.....	10,329,782	35,403,781	488,915	1,269,131	3,476,021	7,309,259	14,294,718	43,982,171	3.08

Table 177.—Output and Value of Coal in Canada, by Kinds and by Provinces
1937 and 1938

(Short tons)

Province	1937			1938		
	Number of mines	Quantity	Value	Number of mines	Quantity	Value
			\$			\$
NOVA SCOTIA (Bituminous).....	38	7,256,954	25,640,819	41	6,236,417	22,523,802
NEW BRUNSWICK (Bituminous).....	24	364,714	1,180,611	22	342,238	1,133,346
MANITOBA (Lignite).....	2	3,172	7,709	2	2,016	5,660
SASKATCHEWAN (Lignite).....	*143	1,049,348	1,494,337	*134	1,022,166	1,380,416
ALBERTA—						
Bituminous.....	17	2,413,784	6,975,168	17	2,310,479	6,506,156
Sub-bituminous.....	17	506,260	1,314,196	20	488,915	1,269,131
Lignite.....	236	2,642,795	6,274,547	239	2,451,839	5,923,183
Total.....	†270	5,562,839	14,563,911	†276	5,251,233	13,698,470
BRITISH COLUMBIA (Bituminous).....	25	1,598,843	5,863,849	22	1,440,287	5,237,077
YUKON (Bituminous).....	1	84	812	1	361	3,400
Canada—						
Bituminous.....	105	11,634,379	39,661,259	103	10,329,782	35,403,781
Sub-bituminous.....	17	506,260	1,314,196	20	488,915	1,269,131
Lignite.....	381	3,695,315	7,776,593	375	3,476,021	7,309,259
Total.....	503	15,835,954	48,752,048	498	14,294,718	43,982,171

* Exclusive of 46 small mines in operation during part of 1937 and 33 small mines operating during part of 1938.

† Exclusive of 53 small mines operated under special permits in 1937 and 39 small mines in 1938.

Table 178.—World Production of Coal* 1937 and 1938

(Including brown coal)

(Long tons)

Country	1937	1938	Country	1937	1938
BRITISH EMPIRE			BRITISH EMPIRE—Con.		
Great Britain—			Canada—		
Anthracite.....	6,335,776	6,278,140	Bituminous.....	10,387,838	9,223,020
Bituminous.....	234,073,660	220,737,168	Sub-bituminous.....	452,018	436,531
Northern Ireland.....	1,203	350	Lignite.....	3,299,388	3,103,590
Eire—			British Borneo—		
Anthracite.....	104,966	90,701	Brunei.....	444	464
Semi-bituminous.....	20,958	27,751	State of North Borneo.....		
Nigeria.....	363,181	362,516	Federated Malay States.....	627,890	477,908
Southern Rhodesia.....	1,013,086	1,027,342			
Union of South Africa.....	15,246,129	16,026,987			

Table 178.—World Production of Coal* 1937 and 1938—Concluded

(Including brown coal)

(Long tons)

Country	1937	1938	Country	1937	1938
BRITISH EMPIRE—Conc.			FOREIGN COUNTRIES—Conc.		
India—			Portugal—		
Gondwana Coalfields.....	24,751,343	27,823,951	Anthracite.....	228,260	277,290
Tertiary Coalfields.....	465,043	518,955	Bituminous.....	17,168	16,581
Used by Miners.....	626,000	†	Brown coal.....	22,439	14,619
Australia—			Roumania—		
Bituminous.....	12,074,274	11,680,159	Anthracite.....	3,588	3,214
Lignite.....	3,393,919	3,675,450	Bituminous.....	294,657	289,727
New Zealand—			Brown coal.....	1,616,921	1,792,262
Bituminous.....	969,984	977,850	Lignite.....	233,856	270,006
Brown coal.....	1,186,320	1,112,414	Russia—		
Lignite.....	121,495	131,824	Anthracite.....	120,643,000	130,300,000
Total British Empire.....	315,000,000	304,000,000	Bituminous.....		
			Lignite.....		
			Spitzbergen and Bear Island.....	754,035	616,623
FOREIGN COUNTRIES			Sweden.....	453,193	424,222
Albania—			Switzerland (b).....	4,000	3,000
Lignite.....	4,000	4,000	Algeria.....	13,997	12,979
Austria—			Belgian Congo.....	35,917	40,618
Bituminous.....	226,584	222,000	Morocco (French)—		
Brown coal.....	3,190,571	3,477,000	Anthracite.....	105,458	109,000
Belgium—			Mozambique.....	18,890	18,364
Anthracite and semi-anthracite	6,588,307	29,106,820	Greenland.....	6,000	†
Bituminous.....	22,799,348		Mexico.....	897,629	879,035
Bulgaria—			United States—		
Anthracite.....	2,502	3,937	Anthracite.....	46,300,387	41,159,846
Bituminous.....	116,021	136,041	Bituminous and lignite.....	397,795,937	307,705,000
Lignite.....	1,704,763	1,825,898	Brazil.....	750,742	869,000
Czecho-Slovakia—			Chile.....	1,969,384	2,028,852
Bituminous.....	16,512,541	13,300,000	Colombia.....	325,000	855,000
Brown coal.....	17,612,727	12,900,000	Peru—		
France—			Anthracite.....	2,872	113,000
Anthracite and bituminous (a).....	43,618,141	45,762,612	Bituminous.....	94,605	
Lignite.....	999,522	1,040,552	Venezuela (c).....	11,737	5,601
Germany—			China.....	†	†
Bituminous.....	181,598,670	183,238,362	Netherlands East Indies.....	1,341,971	1,433,641
Brown coal.....	181,791,547	191,898,839	Formosa.....	†	†
Greece—			French Indo-China—		
Lignite.....	120,013	†	Anthracite.....	2,229,206	2,249,500
Hungary—			Bituminous.....	42,348	53,800
Bituminous.....	902,545	9,211,880	Brown coal.....		
Brown coal.....	7,927,904		Lignite coal.....		4,100
Lignite.....			Japan—		
Lignite (dehydrated).....	140,919		Semi-anthracite and bituminous.....	†	†
Italy—			Brown coal.....	†	†
Anthracite.....	93,559	130,109	Karafuto.....	2,495,528	†
Bituminous.....	855,654	2,185,904	Korea—		
Brown coal.....	1,042,502		Anthracite.....	2,311,000	†
Jugoslavia—			Lignite.....		
Bituminous.....	432,405	4,401,672	Manchuria.....	†	†
Brown coal.....	3,475,749	1,249,478	Philippine Islands.....	21,185	38,333
Lignite.....	1,046,889		Turkey—		
Netherlands—			Bituminous.....	2,270,435	2,519,000
Bituminous.....	14,095,084	13,274,508	Lignite.....	113,252	142,298
Brown coal.....	140,793	167,942	Total Foreign countries....	1,200,000,000	1,120,000,000
Poland—			Grand Total.....	1,510,000,000	1,420,900,000
Bituminous.....	35,646,160	37,502,220			
Brown coal.....	18,616	9,376			

* Data obtained from *The Mineral Industry of the British Empire and Foreign Countries*.

† Information not available.

(a) Includes about 6,000,000 tons of anthracite each year.

(b) United States Bureau of Mines estimate.

(c) Excluding production in government owned mines.

THE COKE AND ARTIFICIAL GAS INDUSTRY

Production from coke and gas plants in Canada during 1938 was valued at \$39,721,530. This output was 5 per cent under the record of \$41,702,929 established in the previous year but was only 0.4 per cent below the total of \$39,871,898 reported for 1936. Output for the year under review included 2,352,003 tons of coke valued at \$16,895,067 at the works, 43,066,381 thousand cubic feet of illuminating and fuel gas valued at \$19,811,271 and other products worth \$3,015,192.

Thirty coke and gas works were operated in 1938, including 8 by-product plants, 2 bee-hive plants and 20 retort coal and water gas plants. Seventeen of these works were located in Ontario, 4 in British Columbia, 3 in Quebec, 2 in Manitoba, 2 in Nova Scotia and 1 in each of New Brunswick and Alberta. In addition to the above producers 1 company in Quebec and 2 in Ontario purchased coke-oven gas and distributed it for domestic or commercial use and data covering their operations have been included to round out the figures for the industry.

Output of coke from gas retorts, by-product and bee-hive ovens, totalled 2,352,003 tons in 1938 compared with 2,570,385 tons in 1937 and 2,404,793 tons in 1936. By-product and bee-hive ovens produced 2,120,588 tons of coke in 1938 and gas retorts made 231,415 tons. In addition, 64,009 tons of petroleum coke were recovered in petroleum refineries.

Data in the distribution of coke (except petroleum coke) by the producers show that 863,306 tons were sold for domestic use, 702,038 tons were used in metallurgical works operated by the producing companies, 232,334 tons were used by coke plants as fuel or to make water gas and 426,375 tons were sold for other uses. The total distribution was 2,224,053 tons leaving about 128,000 to be added to stocks. Total stocks of oven and gas coke at the end of 1938 amounted to 377,339 tons.

Imports of coke made from coal dropped to 414,682 tons in 1938 from 417,733 tons in 1937 and exports to 30,537 tons from 36,959 tons. Imports of petroleum coke during this period also dropped to 81,294 tons from 119,503 tons while exports declined to 25,408 tons from 49,957 tons.

Production of manufactured gas in 1938 amounted to 42,932,721 thousand cubic feet of which 34,360,225 thousand cubic feet were from by-product ovens and 8,571,496 thousand cubic feet from gas plants. Sales of gas by the producers totalled 15,198,068 thousand cubic feet of which 8,727,160 thousand cubic feet were from by-product ovens and 6,470,908 thousand cubic feet were from gas works. Most of the remaining gas was used as a fuel in the producing plants or their associated metallurgical works. These figures do not include 41,232 thousand cubic feet of Pintsch oil gas for lighting railway cars, 6,486,618 thousand cubic feet of still gas recovered at petroleum refineries, nor iron blast furnace gas and some producer gas which was recovered and used by the producers but for which no records are available.

The number of customers served with manufactured gas in 1938 was 475,737, the number of active meters was 500,373, the length of distributing mains was 3,718 miles, and the average calorific value of the gas sold ranged from 450 to 533 B.T.U. per cubic foot.

Table 180.—Materials Used in Coke and Gas Industry in Canada, 1937 and 1938

Materials	1937		1938	
	Quantity	Cost at works	Quantity	Cost at Works
		\$		\$
Bituminous coal carbonized in ovens or retorts—				
(a) Canadian.....short ton	1,154,315	4,198,788	1,008,895	4,256,564
(b) Imported.....short ton	2,423,243	11,440,385	2,215,469	10,784,493
Bituminous coal for making water gas—				
Imported.....short ton	2,392	17,839	3,650	27,191
Coke for gas-making—				
(a) Purchased.....short ton	3,907	36,620	4,150	39,351
(b) Companies' own make.....short ton	92,515	662,053	87,923	606,880
Oil used for enriching water gas.....imp. gal.	4,017,360	299,922	4,358,714	327,027
Absorbing and wash oil.....imp. gal.	228,336	26,550	243,089	26,956
Caustic soda.....pound	551,619	12,481	745,762	12,084
Lime.....ton	2,735	27,529	2,396	23,724
Water.....\$		16,950		17,341
Oxide or purifying materials.....\$		40,414		41,013
Sulphuric acid, 66° Bé.....pound	46,357,679	328,521	43,713,138	317,195
All other materials.....\$		109,905		123,824
Total Cost.....		17,217,957		16,603,643

Table 181.—Production in Canada, Imports and Exports of Coke and Its By-Products, 1937 and 1938

	1937		1938	
	Quantity	Value	Quantity	Value
Coke				
		\$		\$
PRODUCTION—by provinces—				
Nova Scotia, New Brunswick and Quebec..... tons	853,122	5,548,042	754,975	5,040,400
Ontario..... tons	1,504,334	11,522,965	1,365,571	10,339,065
Manitoba, Alberta and British Columbia..... tons	212,929	1,395,061	231,457	1,515,602
Total..... tons	2,570,385	18,466,068	2,352,003	16,895,067
IMPORTS..... tons	417,733		414,682	
EXPORTS..... tons	36,959	236,496	30,537	197,640
AVAILABLE FOR CONSUMPTION..... tons	2,951,159		2,736,148	
Other Products				
PRODUCTION—				
Ammonium sulphate..... tons	29,788	683,556	28,128	671,762
Gas: Sales..... M cu. ft.	15,289,839	14,732,531	15,198,068	15,001,142
Used in own plants..... M cu. ft.	18,330,349	2,429,972	16,890,810	2,365,330
Used in associated metallurgical works..... M cu. ft.	10,652,774	1,398,776	9,259,954	1,122,106
Gas otherwise accounted for, but not sold..... M cu. ft.	235,652	62,057	228,899	61,278
Not accounted for..... M cu. ft.	1,662,708	1,299,473	1,488,650	1,161,415
Benzol..... imp. gal.	2,980,697	590,302	3,292,058	511,276
Toluol and xylol..... imp. gal.	731,408	270,557	3,223,959	399,578
Other light oils..... imp. gal.	3,824,592	308,546		
Tar..... imp. gal.	27,789,567	1,440,578	26,081,011	1,417,750
Ammonia liquor..... pound N.H. ₃	1,618,661	16,187	1,482,646	14,826
All other products.....		4,326		
IMPORTS—				
Ammonium sulphate..... tons	3,230	82,440	5,911	156,540
Coal tar and pitch.....		203,254		290,186
EXPORTS—				
Ammonium sulphate..... tons	56,481	1,212,258	77,191	1,697,204
Coal tar and pitch..... gal.	2,140,349	135,531	5,020,939	254,358

NATURAL GAS INDUSTRY

Natural gas production in Canada during 1938 advanced to 33,444,791 thousand cubic feet valued at \$11,587,450 from the 1937 output of 32,380,991 thousand cubic feet worth \$11,674,802 and, the 1936 total of 28,113,348 thousand cubic feet at \$10,762,243.

New Brunswick wells produced 577,492 thousand cubic feet compared with 576,671 thousand cubic feet, a year ago. Wells in the Stony Creek field, near Moncton, supplied gas for the use of approximately 5,700 consumers in Moncton and Hillsboro. There were 36 gas wells in operation in this province at the end of 1938.

An increase of 1.9 per cent was recorded in Ontario's output; the 1938 total was 10,952,806 thousand cubic feet as against 10,746,334 thousand cubic feet in 1937. Developments in this province during 1938 were summarized as follows by Col. R. B. Harkness, Commissioner of Gas for Ontario:

"On the whole, the natural gas industry is in a healthy state and producers are optimistic as indicated by the great increase in acreage under lease. The gas fields are producing sufficient to meet the demands, although the pressure in the old fields is becoming dangerously low. Drilling in the Brownsville field has practically ceased; wells have been spaced much closer than has ever before been the practice excepting along boundaries of lease blocks.

"The practice of "crowding the line" along competitive boundary lines has been frowned on by the Department of Mines since the control of the industry was first placed in the hands of the government. A regulation was put into effect in 1919 fixing the distance between the wells of opposing interests at 1,000 feet, a distance considered to be good practice. Prior to this date wells of opposing interests had been drilled as close as 50 feet. The 1919 regulation was found

unsatisfactory because where wells were drilled on small acreages or on narrow leases and all others made to keep 1,000 feet distant, other lease owners would in many cases have been deprived of the right to drill for and recover their own gas. So much investigation and arbitration was entailed in the administration of this regulation and such difficulty was found in carrying it out that it was repealed by common consent and a new regulation substituted on February 4, 1937. The new regulation is:

No person shall drill any well within three hundred and fifty (350) feet of a boundary line of a property owned or leased by any person or company other than the person or company which proposes to drill the said well, without the approval of the Commissioner.

"Manufacturers of gas appliances continue to improve their wares both along lines of convenience, efficiency and in colour schemes. A new gas range known as the C. P. Range (Certified Performance) is now offered that fulfills any and every task that the most particular housewife might demand. Other than new and improved labour saving devices and perfected insulation, a pressure regulator and filter has been added which insures against imperfect combustion resulting from pressure variations. With the assurance that no carbon monoxide can be formed from partially burned gases, the smoke pipe has been removed from most modern gas stoves. Another appliance that has reached maturity of design and has passed trials in the hands of the public is the gas refrigerator. It operates on either gas or kerosene and has no moving parts. Further advances have been made in the design of moderate price water heaters and furnace burners.

"The increase in the consumption of gas in 1938 over 1937 is only about 2 per cent and can be accounted for by the increase in the number of consumers. Brownsville and Glencoe have been added to the municipalities supplied with natural gas. There has been a healthy growth in the demand for natural gas for all purposes.

"There has been little change in the rates charged for natural gas, and any revision has been somewhat downward in the average price.

"Drilling continued in the Declute field with average success. The wells drilled in Raleigh township are in the extension of the Dover township gas and oil field, which now reaches across the Thames River into Raleigh township for about one mile, and the limits have not yet been reached. These wells are about 3,000 feet deep, and most of them produce both gas and oil. No drilling was done in Chatham township in 1938, where eight producing wells are now closed in until further exploratory work is done. Drilling in the Dawn field in Lambton county has been most discouraging in 1937 and 1938; no producing wells have been found. Drilling in Middlesex to test the producing horizons of the Guelph and Clinton has met with no success, nor has a deep test to the Trenton limestone in Blanshard township, Perth county. In the Brownsville field drilling continued throughout the year. There were at the end of the year seventy-seven producing wells. Nine dry holes were drilled in Elgin county, in search of gas in the Guelph, which is the producing horizon of the Brownsville field. There was little drilling in Norfolk county. Drilling in Haldimand county has fallen off greatly; 50 wells were drilled in 1938 as compared with 67 wells in 1937. In previous years most of this drilling was in Walpole township, but in the past year Rainham township received the most attention. In Lincoln, Welland and Brant counties a few wells were drilled each year. These fields are very old, and the rock pressure has declined to a minimum. Drilling in Bruce and Grey counties did not prove profitable, and the few producers drilled in 1936 with one exception have been abandoned. Two more producing wells have been drilled in the vicinity of Picton in Prince Edward county.

"Although drilling activity as represented by totals was not as active in 1938 as in 1937, the year saw considerable exploratory work, which in 1939 is rapidly developing a new gas field in Malahide township. A new territory in the northern part of Huron county is claiming the attention of prospectors, who believe that a promising structure has been located. This structure was indicated in a map by M. Y. Williams published by the Geological Survey of Canada in Memoir 111, "The Silurian Geology and Faunas of Ontario Peninsula and Manitoulin and Adjacent Islands." Further work by independent geologists has been done since the work mentioned was published in 1919.

"In 1938, 53 dry wells with a footage of 63,885 and 118 producing wells with a footage of 114,801 were drilled; a total of 171 wells and 178,686 feet.

"In the past year distributing companies have spent a very considerable sum in improvements to service. A distributing system was installed in Brownsville by the Oxford Pipe Line Company and in Glencoe by the Union Gas Company, giving these municipalities natural gas for the first time.

"A compressor station was built by the Dominion Natural Gas Company at Rainham, in the central part of Haldimand county, in order to improve service to the Port Colborne and St. Catherine areas. Some remote wells in Sherbrooke township were also connected into the Port Colborne pipeline, and some larger sized pipelines were added in St. Catharines. In St. Thomas a considerable amount of new intermediate pressure line was laid, and two new regulator stations were installed. This became necessary through the increase in the demand for gas.

"The Dominion Natural Gas Company sold its wells and lines in and around the villages of Vienna, Port Burwell, and Straffordville to the Central Pipe Line Company. The Dominion Natural Gas Company report seven leakage surveys, renewals, and repairs throughout their pipeline system.

"The Union Gas Company report having laid 19 miles of high pressure transmission pipeline from 3 inch to 10 inch to replace old pipe, which was mostly of smaller sizes. This includes renovating and various alterations to improve service to municipalities. Five miles of new distributing lines were laid to replace old pipe in Windsor, Wallaceburg, Petrolia, Sarnia, Dresden and Tilbury.

"The Provincial Gas Company reports having replaced one mile of 8 inch pipe and 1½ miles of smaller sizes.

"The Central Pipe Line Company extended their operation in the Brownsville field. Originally, they had two wells supplying gas through a 3 inch pipeline to Aylmer, with a purification plant at Springfield; they have now drilled producing wells in the adjoining lots in Bayham township and are delivering gas through an 8 inch pipeline to the Dominion Natural Gas Company's transmission line near the village of Eden. This company has built another purification plant near Corinth."

Ontario's natural gas industry in 1938 included the activities of 183 operating, distributing and drilling firms who reported a total capital investment of \$51,054,815. Employment was furnished by these firms to 1,412 salaried employees and wage-earners who received salaries and wages totalling \$1,657,917. Fuel consumption by these operators necessitated an expenditure of \$49,030; 77.2 per cent of this outlay was for natural gas.

Natural gas production in Saskatchewan declined to 90,285 thousand cubic feet from the 1937 output of 100,380 thousand cubic feet. The 1938 output was used principally to supply consumers in Lloydminster.

Production from Alberta wells was recorded at 21,822,108 thousand cubic feet; this represented an increase of 4.1 per cent over the output, a year ago. These figures include only the natural gas consumed for industrial and domestic purposes and do not take into account the waste gas burned in the Turner Valley field and the gas piped to the Bow Island field for storage.

The Turner Valley field, about 35 miles southwest of Calgary, is the largest natural gas producing area in Canada. In 1938, the consumption of Turner Valley gas for industrial (including drilling) and domestic use was 15,333,488 thousand cubic feet as against 14,101,222 thousand cubic feet, a year ago. Approximately 23,800 consumers in Calgary, Lethbridge and the district were served with this gas in 1938; in addition, a considerable quantity was used in the field for drilling purposes. Continuing the practice of previous years, a large quantity of Turner Valley gas was piped to the Bow Island field for repressuring wells in that area. Since 1930, approximately 13,755,000 thousand cubic feet of this gas has been piped into these wells.

Consumption in the city of Medicine Hat totalled 1,999,404 thousand cubic feet compared with 2,262,552 thousand cubic feet in 1937. Some 2,500 consumers were supplied with gas from the Medicine Hat field in 1938. About 270 industrial and domestic users were supplied with 594,119 thousand cubic feet of gas from the Redcliff field, which is located about two miles west of Medicine Hat.

The Viking field, located approximately 80 miles southeast of Edmonton, supplied 11,500 consumers in that city and users outside the city with 3,338,955 thousand cubic feet of gas in 1938. Twenty-one wells were in operation in the Viking field during the year.

Approximately 300 consumers in Wainwright were supplied with gas from the Maple Leaf well in the Fabyan field.

There were 97 wells in Alberta producing natural gas ONLY on December 31, 1938; a year ago, 100 wells were active. Companies operating in this industry in 1938 reported capital employed amounting to \$26,057,961 as against \$24,710,670 in 1937. The industry employed 445 persons who received salaries and wages totalling \$703,472. Fuel and electricity used during the year cost \$2,660.

At Fort Norman, in the Northwest Territories, 1,500 thousand cubic feet of natural gas were used for power purposes in 1938.

Imports of mixed gas (natural and artificial) by pipeline from the United States amounted to 133,062 thousand cubic feet worth \$87,311. In 1937, importations totalled 114,275 thousand cubic feet at \$74,799.

There were 218 operators in the natural gas industry in Canada in 1938; capital employed by these operators totalled \$79,143,830. This industry furnished employment to 1,966 employees who were paid \$2,506,121. The cost of fuel and electricity used during the year was \$67,725.

Table 182.—Production of Natural Gas in Canada, by Provinces, 1929-1938

Year	New Brunswick		Ontario		Manitoba		Alberta		Canada	
	M cu. ft.	Value	M cu. ft.	Value	M cu. ft.	Value	M cu. ft.	Value	M cu. ft.	Value
	\$		\$		\$		\$		\$	
1929.....	678,456	333,002	8,586,475	4,959,695	600	180	19,112,931	4,684,247	28,378,462	9,977,124
1930.....	661,975	325,751	7,965,761	5,034,828	600	180	20,748,583	4,929,226	29,376,919	10,289,985
1931.....	655,891	323,184	7,419,534	4,635,497	600	180	17,798,698	4,067,893	25,874,723	9,026,754
1932.....	662,452	326,191	7,386,154	4,719,297	600	180	15,370,968	3,853,794	23,420,174	8,599,462
1933.....	618,033	302,706	7,166,659	4,523,085	600	180	15,352,811	3,886,263	23,138,103	8,712,234
1934.....	623,601	306,005	7,682,851	4,741,368	600	180	14,841,491	3,707,276	(a)23,162,324	(a)8,759,652
1935.....	615,454	303,886	8,158,825	4,938,084	600	180	16,060,349	4,113,436	(b)24,910,786	(b)9,563,141
1936.....	606,246	298,819	10,006,743	6,052,294	600	180	17,407,820	4,376,720	(c)28,113,348	(c)10,762,243
1937.....	576,671	283,922	10,746,334	6,588,798	600	180	20,955,506	4,766,437	(d)32,380,991	(d)11,674,802
1938.....	577,492	284,689	10,952,806	6,460,764	600	180	21,822,108	4,807,346	(e)33,444,791	(e)11,587,450

(a) Includes production in Saskatchewan of 13,781 M cu. ft. at \$4,823.

(b) Includes production in Saskatchewan of 75,558 M cu. ft. at \$7,555.

(c) Includes production in Saskatchewan of 90,839 M cu. ft. at \$33,985 and in the Northwest Territories of 1,100 M cu. ft. at \$245.

(d) Includes production in Saskatchewan of 100,380 M cu. ft. at \$35,130 and in the Northwest Territories of 1,500 M cu. ft. at \$335.

(e) Includes production in Saskatchewan of 90,285 M cu. ft. at \$34,136 and in the Northwest Territories of 1,500 M cu. ft. at \$335.

Table 183.—Production of Natural Gas in Canada, by Months, 1938

	New Brunswick	Ontario	(a) Manitoba	Saskatchewan	Alberta	Canada
	M cu. ft.	M cu. ft.	M cu. ft.	M cu. ft.	M cu. ft.	M cu. ft.
January.....	72,760	1,576,320	50	11,957	2,404,750	4,065,837
February.....	69,635	1,437,690	50	16,564	2,523,826	4,047,765
March.....	67,298	1,184,070	50	9,840	1,944,099	3,205,357
April.....	59,887	970,049	50	6,512	1,917,026	2,953,524
May.....	50,177	602,529	50	4,614	1,486,372	2,143,742
June.....	37,305	505,549	50	1,670	1,185,754	1,730,328
July.....	26,472	430,628	50	1,887	1,136,218	(b)1,595,755
August.....	22,061	474,426	50	2,880	1,271,891	(b)1,771,808
September.....	29,314	606,226	50	2,347	1,294,354	(b)1,932,791
October.....	41,490	752,359	50	7,757	1,721,816	2,523,472
November.....	43,970	1,048,986	50	10,362	2,278,593	3,381,961
December.....	57,123	1,363,974	50	13,895	2,657,409	4,092,451
Total.....	577,492	10,952,806	600	90,285	21,822,108	(b)33,444,791

(a) Estimated.

(b) Includes production from Fort Norman, Northwest Territories.

Table 184.—Natural Gas Production in Ontario, by Fields, 1937 and 1938 (a)

County	Field	1937	1938
		M cu. ft.	M cu. ft.
Essex.....	Kingsville.....	3,245,333	3,265,726
Kent.....	Tilbury.....		
	Declute.....	1,512,300	1,797,789
Lambton.....	Dover.....	636,552	509,677
Oxford.....	Dawn and Oil Springs.....	1,890,874	1,894,730
Elgin.....	Brownsville Field/Dereham.....	455,611	506,005
Elgin.....	Bayham.....	31,320	50,917
Norfolk.....	Norfolk.....	260,974	113,651
Lincoln.....	Wentworth.....	441,375	437,867
Haldimand.....	Lincoln.....		
Wentworth.....	Haldimand.....	1,784,257	1,912,882
Brant.....	Wentworth.....		
Bruce.....	Onondaga.....	112,482	135,348
Welland.....	Amabel.....	2,763	1,129
Wells in surface drift.....	Welland.....	298,493	253,085
Private wells.....	Howard and Harwich.....	14,000	14,000
		60,000	60,000
Total produced.....		10,746,334	10,952,806
Value.....		\$ 6,588,798	6,460,763
Imported mixed gas.....		113,495	125,807
Total distributed.....		10,859,829	11,078,613

(a) Prepared by the Ontario Department of Mines.

Table 185.—Number of Gas Wells in Canada, by Provinces, 1936-1938

	New Brunswick	Ontario	Manitoba	Saskatchewan	Alberta	Canada
Productive wells at beginning of year...1936	35	2,998	6	1	94	3,134
.....1937	35	3,055	5	1	95	3,191
.....1938	37	3,065	5	3	100	3,210
Number of productive wells drilled.....1936	1	155			1	167
.....1937	2	135				137
.....1938	2	114			1	117
Number of dry wells drilled.....1936		89				89
.....1937	1	66			2	69
.....1938		53				53
Number of wells abandoned.....1936	1	80				81
.....1937		98				98
.....1938	3	89			1	93
Productive wells at end of year.....1936	35	3,055	5	1	95	3,191
.....1937	37	3,065	5	3	100	3,210
.....1938	36	3,122	5	3	97	3,263

Table 186.—Natural Gas Wells in Ontario, by Townships, 1937 and 1938

Township	1937				1938			
	No. of producing wells in operation Dec. 31, 1936	No. of wells abandoned this year	No. of dry wells drilled this year	No. of producing wells drilled this year	No. of producing wells in operation Dec. 31, 1937	No. of wells abandoned this year	No. of dry wells drilled this year	No. of producing wells drilled this year
Amabel.....	2				7	4		
Ancaster.....						1		
Bayham.....	49	5	7	12	50		3	13
Bertie.....	96	5	3	6	101	3	1	9
Binbrook.....	52				52	1		
Blanshard.....							1	
Caistor.....	62	3		1	62	3		4
Canboro.....	175	11	1	5	166	10		
Caledon, East.....								
Cayuga, North.....	200	11	6	8	198	7	1	1
Cayuga, South.....	60	2			49	1		
Charlottesville.....	15				15	2		
Chatham.....			4					
Crowland.....	26	2		2	24			
Dawn.....	23		4		23		3	
Delaware.....							1	
Dereham.....			3	32	44		1	14
Dorchester, North.....			1					
Dorchester, South.....							2	
Dover, East.....	22		2		19	1		1
Dover, West.....								
Dunn.....	51				49	2	1	
Dunwich.....							2	
Easthope, North.....			2					
Enniskillen.....	4				2			
Euphemia.....							2	
Gainsboro.....	13				13			2
Glanford.....	12				12			
Gosfield, South.....	21		1	1	25			
Hastings.....			2					
Houghton.....	4				4			
Humberstone.....	57	1			56			
Keppell.....					1	1		
Malahide.....	1		1		1		3	
Malden.....							1	
Marysburgh.....				5	4			2
Mersea.....	3			1	3			1
Middleton.....	49	1	2	1	54			
Moulton.....	107	14	2	2	106	2		
Nissouri, East.....			1				1	
Nissouri, West.....							2	
Oneida.....	71	3		3	62	8		
Onondaga.....	41	5		4	36	6		5
Orford.....							1	
Rainham.....	291	7	1	10	295	4	9	19
Raleigh.....	32	1	4	7	39	1	4	12
Romney.....	136				136	5		5
Sarnia.....	13							
Seneca.....	177	2	1	1	170	9		
Sherbrooke.....	12	1			11			
Sombra.....								
Southwold.....							1	
Tilbury East.....							1	
Tilbury, North.....	144	4	2	2	141	8		1
Tilbury, West.....			1					
Townsend.....	2				2			
Tuscarora.....	84	8		2	78	2		2
Wainfleet.....	27			4	31	2	1	3
Walpole.....	412	7	12	15	413	6	6	13
Walsingham, N.....	13				13			
Walsingham, S.....	13				13			
Windham.....	10				10			
Willoughby.....	41	1			41		3	3
Woodhouse.....	63	4	2	4	65		1	4
Yarmouth.....							1	
Private wells.....	300				300			
Surface wells.....	69				69			
Total.....	3,055	98	66	135	3,065	89	53	114

Table 187.—Capital Employed in the Natural Gas Industry in Canada, by Provinces, 1937 and 1938

	1937			1938		
	Ontario	Alberta	Canada	Ontario	Alberta	Canada
	\$	\$	\$	\$	\$	\$
CAPITAL EMPLOYED AS REPRESENTED BY—						
Cost of lands, buildings, plant, machinery and tools.....	38,990,404	22,584,231	†63,354,263	40,440,653	23,820,894	†66,076,199
Cost of supplies and stock on hand.....	430,127	153,026	† 653,090	611,290	160,229	† 788,407
Cash, trading and operating accounts and bills receivable.....	9,471,160	1,973,413	†11,603,754	10,002,872	2,067,838	†12,279,224
Total.....	48,891,691	24,710,670	†75,611,107	51,054,815	26,057,961	†79,143,830

† Includes data for New Brunswick, Manitoba and Saskatchewan.

Table 188.—Employees, Salaries and Wages in the Natural Gas Industry in Canada, by Provinces, 1937 and 1938

Province	*Average number of employees				Salaries and wages		
	Salaried employees		Wage-earners	Total	Salaries	Wages	Total
	Male	Female					
1937							
New Brunswick.....	14	8	66	88	41,250	79,839	121,089
Ontario.....	503	126	827	1,456	899,716	759,352	1,659,068
Saskatchewan.....	6	.....	9	15	5,040	7,027	12,067
Alberta.....	95	35	339	469	196,014	499,887	695,901
Canada.....	618	169	1,241	2,028	1,142,020	1,346,105	2,488,125
1938							
New Brunswick.....	13	7	65	85	41,538	78,223	119,761
Ontario.....	527	126	759	1,412	907,025	750,892	1,657,917
Saskatchewan.....	6	.....	18	24	5,340	19,631	24,971
Alberta.....	94	35	316	445	198,126	505,346	703,472
Canada.....	640	168	1,158	1,966	1,152,029	1,354,092	2,506,121

* See footnote on page 65.

Table 189.—Casing Used in the Natural Gas Industry in Canada, 1938

Size	Weight	Length	Size	Weight	Length
Inches	Pounds	Feet	Inches	Pounds	Feet
3.....	4,351	4,351	8.....	123,803	4,218
3½.....	7,572	631	8½.....	162,406	6,541
4.....	7,800	390	8¾.....	26,820	745
4½.....	325	50	10.....	83,728	2,224
4¾.....	37,008	2,534	10½.....	95,445	2,121
5.....	3,043	358	10¾.....	18,765	417
5½.....	11,021	671	12.....	3,944	116
5¾.....	45,494	3,709	12½.....	41,455	815
6.....	46,368	1,932	13.....	26,782	499
6½.....	182,126	12,322	15½.....	2,821	40
6¾.....	167,301	7,203	18.....	6,781	77
7.....	42,432	1,768			
			Total.....	1,147,591	53,732

PEAT

Peat production in Canada during 1938 totalled 620 tons valued at \$3,500 as compared with the preceding year's total of 478 tons at \$2,676. The 1938 output was obtained from Ontario bogs.

Table 190.—Production of Peat (for Fuel) in Canada, 1934-1938

Year	Tons	Value	Year	Tons	Value
		\$			\$
1934.....	1,878	7,343	1937.....	478	2,676
1935.....	1,340	5,761	1938.....	620	3,500
1936.....	1,341	7,376			

THE PETROLEUM INDUSTRY IN CANADA

Including (1) Production of Crude Petroleum; and (2) Petroleum Products

1. Production of Crude Petroleum

A new high record was set up in the production of crude petroleum and natural gasoline in Canada during 1938 when 6,966,084 barrels were produced. In 1937, the previous record year, 2,943,750 barrels were produced while in 1936 the output totalled 1,500,374 barrels.

New Brunswick wells produced 19,276 barrels in 1938 compared with 18,089 barrels a year ago. The Stony Creek field near Moncton was the source of the 1938 output. The small topping plant at Weldon was in operation during the year and produced gasoline and fuel oil from the Stony Creek crude oil.

Ontario's petroleum production rose to 172,641 barrels, averaging \$2.08 per barrel, from the 1937 total of 165,205 barrels at \$2.15 a barrel. In 1936, Ontario wells produced 165,495 barrels worth \$2.12 a barrel, while in 1935 the output was 165,041 barrels at \$2.10 per barrel.

The Ontario crude petroleum industry in 1938 was reviewed by Col. R. B. Harkness, Commissioner of Gas, as follows:

"The Petrolia field which is still operating was 'brought in' in 1866. The increase shown in the Bothwell field is from wells drilled between the years 1862 and 1866. In the case of the Bothwell field, all the wells were completed by the end of 1866, while in Petrolia with its thousands of wells, it took some years to completely drill the field. The Oil Springs' wells have been in continuous operation since 1881 or 1882. Wells in Bothwell and Petrolia that were drilled 72 years or more ago are being pumped to-day and return a profit to their owners. The Bothwell wells were dormant for a number of years, but the Petrolia wells have been continuously in operation. This production cannot be said to be a gift of nature, it has been achieved only by the skill, the dogged determination and fight in these operators to keep this field alive. This is not an easy matter where new equipment, pipe, pumps, tubing and rods must be bought when the price of oil was at rock bottom. These operators have learned through long experience to salvage equipment, get the most use out of it, and by skill in applied mechanics, to reduce this cost of operation by pumping wells from one centrally located power. Thus has the production from these fields been increased.

"In the past year or two the wells drilled by Lick in 1862 have been cleaned out and are pumping oil. Hand-made casing, a bailer, wooden pump rods, wooden drill poles and various relics of the early '60's have been recovered. The Pepper well will be in operation again when the corn field in which it is located is harvested. The Victoria Well, which in 1866 was one of the 'kings of the field' is now ignominiously buried under a pig pen, but a nearby well of the same date is in operation. A well very near the site of the first well to be started (but not finished) in Ontario in 1857 had been reclaimed at the time of writing, September, 1939.

"The increased production in 1938 is due to the bringing in of a small field in Warwick township, Lambton county, and a revival in Mosa township field. This last field has been in operation since 1917, and in 1937 some 13 new wells were drilled which gave the results noted. A number of old wells were "acidized".

Twenty-six drilling rigs were in operation in Ontario during 1938. The capital employed by the operators of these rigs was \$45,933. Thirty-six men were employed during the year who received wages totalling \$16,199. Dry holes drilled numbered 41 with a footage of 19,805. Fifty-six producing wells were drilled to a total depth of 22,459 feet.

Alberta's production of crude petroleum and natural gasoline advanced to a new high level in 1938 despite the drastic proration of wells during October, November and December. This curtailment was due to the usual seasonal decline in consumption.

Production in the Turner Valley field, Alberta, ranged from a low point of 398,000 barrels in February to a peak of 863,000 barrels in September. This variation in output was due in the main part to the fluctuation in market requirements.

There were four natural gasoline absorption plants active in Alberta during 1938. Two of these plants were operated by the Royalite Oil Company Limited. The Gas & Oil Products Limited operated a plant in the South Turner Valley field. The British American Oil Company also operates an absorption plant in this field. The total natural gasoline output of these plants in 1938 was 503,612 barrels compared with 653,887 barrels in 1937 and 597,261 barrels in 1936.

Drilling operations were in progress on 93 wells in Alberta during 1938 and approximately 361,000 feet were drilled. Forty-three wells were brought into production during the year and 7 dry wells were drilled. In 1937 drilling activities were reported on 88 wells and the footage drilled was 289,000. One hundred and ninety-five wells were in operation in Alberta at the close of 1938 and 43 other wells were being drilled in the Turner Valley, Wainwright-Ribstone and other fields. These operations resulted in the use of 442,473 feet of casing weighing 7,418 tons; a year ago, 427,390 feet weighing 7,575 tons were used. The casing used in 1938 was valued at \$1,045,590 as against the preceding year's valuation of \$907,734 and the 1936 total of \$264,581. Capital employed by the 123 firms active in Alberta in 1938 amounted to \$50,477,271. These firms furnished employment to 1,634 employees who received salaries and wages totalling \$2,496,588. Fuel and electricity used during the year cost \$304,090.

Mr. J. L. Irwin, Statistician, Alberta Department of Lands and Mines, summarizes activities in the province in 1938 as follows:

"The most important event of the year, the bringing into production of Home (Millardville), No. 2, materialized towards its close.

"The importance of this event is due to the fact of its isolated position from the proven crude oil zone in southern Turner Valley. Home, No. 2 is situated in the extreme north of the field—legal subdivision 6 of section 33, township 20, range 3, west of the 5th meridian,—which is approximately 2 miles north-west of Royalite, No. 29, the next most northern crude oil producer in Turner Valley.

"Striking the upper lime zone at a depth of 8,032 feet, oil of a 40° Beaume gravity was produced in sufficient quantities to prove that a good commercial well had been established. It was decided, however, to continue drilling to the lower porous section of the lime and secure production from both. With this accomplished the well on its first test gave a flush production of 50 barrels an hour or 1,200 barrels a day with gas pressure strong and increasing.

"Home, No. 2 was completed at a depth of 8,495 feet, 15 feet in the black lime. The upper porous zone was at 8,151 to 8,235 feet and the lower at 8,395 to 8,473 feet, two stray porous horizons having also been discovered between 8,241 and 8,319 feet.

"This new well is 17 miles to the north-west of the proven crude oil zone in the southern end of the Valley. Its coming into production as a major crude producer opens a new and extensive area in the northern end and greatly enlarges the whole field. With the addition of this new potential area, negotiations are already under way for the drilling of more wells in the vicinity, the locations of which are to range anywhere from 2 to 6 miles to the north-west of Home, No. 2.

"The development of Okalta, No. 6 well has been watched with much interest. While it is too early yet to make a statement regarding the final stages of this development, it may be said, however, that the drilling of this well, in this isolated location to the west, has now defined how far oil extends down the west flank.

"At the close of 1938 there were 64 producing crude wells in Turner Valley, compared with only 35 at the end of 1937; 14 others are drilling and there are plans for starting at least 20 more.

"Many large producers were completed during the year and flush productions of the biggest ran from 2,000 to over 5,000 barrels per day.

"On November 22, 1938, an Act was promulgated on the authority of which the Board now functions. The title of this legislation is 'An Act for the Conservation of the Oil and Gas Resources of the Province of Alberta.' A brief summary of the Act follows:—

"The Act is subdivided into four parts. Following the preamble, Part I carries the sub-title of 'Relating to the Conservation of Oil Resources and Gas Resources.'

"This section opens with the constitution of the Board which is to be limited to three members of whom one shall be chairman. With reference to the personnel, already named, W. F. Knode, the chairman, is to hold office until June 30, 1939, and thereafter during the pleasure of the Lieutenant-Governor in Council. F. G. Cottle, C.A., and C. W. Dingman, the other two members, are to hold office until June 30, 1943, and, subsequent to that date, during the pleasure of the Lieutenant-Governor in Council. Should a vacancy in the membership of the Board occur at any time, such vacancy is to be filled by an appointment to be made by the Lieutenant-Governor in Council, the appointee to hold office for a period of five years with a possible extension to this period being sanctioned.

"The Board is authorized and empowered to perform and carry out all duties conferred upon it by the Act, such duties to include the keeping of complete minutes of all meetings, records of all financial business, the employment of professional persons and others, the services of whom may become necessary to carry out the various activities of the Board.

"Authorization for the control and regulation of petroleum is laid down, the control to be effected either by restriction or prohibition or both with the repressuring of any field which may be deemed necessary.

"Within six months of the date upon which the Act comes into force, the preparation of a scheme or schemes for the provision of compensation for persons who may be injured by conservation orders is to be arranged. For the payment of such compensation the Board is to levy the amount thereof by means of a uniform rate on the dollar upon the assessed value of all the petroleum property of the persons who are liable under the scheme for the payment of such compensation.

"Owners of producing wells or those in ownership or control of refineries shall keep all records of petroleum produced or received at refineries, giving the disposition of same with details as to quantity, quality and prices payable.

"Part II of the Act empowers the Board to undertake enforcement of any regulations pursuant to 'The Oil and Gas Wells Act, 1931' whenever such enforcement is directed by the Lieutenant-Governor in Council.

"Part III outlines in detail the assessment and taxation of petroleum properties from the viewpoint of definitions, liability to assessment and taxations, exemption from same, penalties for non-payment of tax, power of Board to order seizure to enforce payment and other matters pertinent to this general heading.

"Part IV deals with the provisions of general application and the powers of the Board as to procedure.

"Steps may be taken and persons employed, if considered necessary, for the enforcement of any order which is made, and, for the purposes thereof, seizure and possession of movable or immovable property in or about any well, together with the books and offices of the owner. Until such order has been complied with, production may be discontinued or the Board may take over management and control of same.

"With reference to investigation or procedure of such a nature, any representative of the Board shall have the powers which may be conferred upon a commissioner appointed pursuant to 'The Public Inquiries Act' for the purpose of taking evidence and for compelling the attendance of witnesses and the production of documents.

"The balance of Part IV deals with powers conferred on the Board relative to inspection of wells and refineries, penalties for failure to comply with provisions of the Act, disposition of taxes and penalties collected, and other matters relative to provisions as laid down for general application of the Act.

"On January 11, 1939, Order in Council, No. 45-39 came into force, by the provisions of which drilling of wells should come under the control of the Board.

"Prior to this date the Board was in charge only of production, the responsibility for all drilling operations being assigned to the Minister. As a result of this order applications for drilling permits were in future to be made out to the Board instead of, as formerly, to the Department.

"With the rapid growth of Alberta's oil production in 1937, coupled with the limitations of a localized market, the refineries introduced the measure of proration which became effective for the first time on September 12, 1937, when the purchase of production was limited by them to 65 per cent of the capacity of wells.

"Towards the end of April with proration varying from time to time it was decided that new tests should be made on an eleven day basis, a well to run for ten days on the proration previously established and on the eleventh day on open-flow production. The new potential by which proration was to be calculated was to be two-thirds of open flow as demonstrated on the eleventh day. This proration varied from time to time depending on storage and market conditions and also on transportation facilities during a period when an additional pipe-line from the field to Calgary was under construction.

"With the appointment of the Petroleum and Natural Gas Conservation Board in 1938 the total quantity of permitted oil production was distributed amongst crude producers by application of a formula which included the factors of gas/oil ratio, bottom hole pressure, well spacing and measured flow through a two inch nipple. On September 2 the Board issued its first allotment of allowable production, which, based on market demand as existent on that date, was to total 28,000 barrels per day. A second allotment followed on September 12 to take care of newly completed wells, but based on the same market demand. A third, made September 24, cared for new completions but influenced by a drop in market reduced the allowable total to 22,000 barrels per day.

"Further drops in the market with consequent reductions in allowables appeared as follows:—October 20, allowable total, 14,500 barrels and October 28, 11,500 barrels. On December 5 a new order increased this total to 12,500 barrels.

"In addition to the encouraging record established by the Turner Valley field during 1938 is that of other oil areas throughout the province. Some have already developed production, whilst others, with the drilling of most interesting tests, hope to reach the same goal.

"As already stated, the most dramatic announcement dealing with newly developed oil areas is the last one to have been made, namely, the bringing in of Home, No. 2 well, in the extreme northern part of Turner Valley.

"The Ribstone area, 30 miles south-east of Wainwright, is carrying out an interesting test and at a depth of approximately 2,000 feet oil occurrences have come into evidence. North Taber Royalties, No. 1 well, 30 miles east of Lethbridge, also is attracting attention. The drilling test in this area has passed a number of gas sands which have proved encouraging.

"The Ram River well, approximately 100 miles west of Red Deer, was spudded in on October 24, and by January 16 had reached a depth of over 700 feet. The Devonian limestone was encountered at the 70 foot level when casing was set. At 300 feet came the first evidence of gas, and a core sample, taken from the 400 foot level, showed a noticeable impregnation of oil, the cores at greater depth showing increased evidence of oil together with porosity. The test is being watched with the greatest of interest.

"Development work in other fields throughout the province includes the Altoba well on the Clearwater River 20 miles to the south-east of the Ram River well; the Pouce Coupe wells near the Alberta-British Columbia boundary in the Peace River country; the Home-Brazeau well in the Brazeau area; the tests at Lloydminster on the Saskatchewan border; the test at Steveville, 70 miles north-west of Medicine Hat; Moose Dome, 30 miles west of Calgary; two wells near Lundbreck in the Crowsnest Pass area; the tests at Castle River and Savannah Creek in the south-west of the province; and Milk River and Del Bonita in the international boundary area.

"Crown leases of the petroleum and natural gas rights active in Alberta for the last three years were as follows:—

Year	Number	Area covered Acres
1936.....	3,838	630,148.35
1937.....	6,466	971,312.48
1938.....	5,261	1,053,297.39

"The reason for the reduced number in 1938, with increased acreage, is due to the fact that on March 30, 1937, the minimum area, which could be acquired under the Petroleum and Natural Gas Regulations, was increased from 40 acres to 160 acres, excepting on isolated areas of less than 160 acres."

Discovery No. 1 and No. 2 wells in the Northwest Territories, near Fort Norman, were operated during 1938 and produced 22,855 barrels of crude petroleum; a year ago, 11,371 barrels were produced. This oil, which ranged from 38° to 41° B_é, was treated at a small refinery near Fort Norman. The resultant products, gasoline and fuel oil, were used to a considerable extent in connection with mining operations in the Great Bear Lake area.

Table 191.—Production of Crude Petroleum in Canada, by Provinces, 1928-1938

Year	New Brunswick		Ontario		Alberta		Northwest Territories		Canada	
	Barrels	Value \$	Barrels	Value \$	Barrels	Value \$	Barrels	Value \$	Barrels	Value \$
1928.....	8,043	21,391	134,094	249,737	482,047	1,764,172	.....	.....	624,184	2,035,300
1929.....	7,499	19,909	121,194	253,678	988,675	3,458,177	.....	.....	1,117,368	3,731,764
1930.....	6,758	17,378	117,302	235,746	1,398,160	4,780,696	.....	.....	1,522,220	5,033,820
1931.....	6,577	15,461	122,365	219,993	1,413,631	3,976,220	.....	.....	1,542,573	4,211,674
1932.....	6,408	14,332	130,343	247,468	906,751	2,751,541	910	9,251	1,044,412	3,022,592
1933.....	8,835	18,111	136,058	253,486	995,832	2,844,157	4,608	23,037	1,145,333	3,138,791
1934.....	11,106	22,277	141,385	299,874	1,253,966	3,104,823	4,438	22,188	1,410,895	3,449,162
1935.....	12,954	18,230	165,041	346,156	1,263,510	3,102,227	5,115	25,575	1,446,620	3,492,188
1936.....	17,112	24,075	165,495	350,767	1,312,368	3,019,930	5,399	26,995	1,500,374	3,421,767
1937.....	18,089	25,496	165,205	356,000	2,749,085	4,961,002	11,371	56,855	2,943,750	5,399,353
1938.....	19,276	27,246	172,641	359,268	6,751,312	8,775,094	22,855	68,565	6,966,084	9,230,173

Table 192.—Production of Crude Petroleum in Canada, by Months, 1938
(Barrel=35 imperial gallons)

Months	*New Brunswick	Ontario	*Alberta	*Northwest Territories	Canada
January.....	56	13,254	444,196	.....	457,506
February.....	7	11,650	401,587	.....	413,244
March.....	25	13,144	467,732	.....	480,901
April.....	3,417	13,760	447,241	.....	464,418
May.....	3,728	15,756	546,719	270	566,473
June.....	1,624	14,241	521,895	1,176	535,936
July.....	1,867	13,321	678,243	8,382	701,813
August.....	4,135	14,657	799,023	7,731	825,546
September.....	3,261	15,023	867,939	6,509	892,732
October.....	3,119	14,624	667,454	3,628	688,825
November.....	1,401	17,003	427,236	.....	445,640
December.....	441	16,208	472,774	.....	489,423
Total.....	23,081	172,641	6,742,039	27,696	6,965,457

* These figures represent the total output each month.

Table 193.—Production of Crude Petroleum in Canada, 1937 and 1938

Provinces	1937		1938	
	Barrels	Total Value	Barrels	Total Value
		\$		\$
NEW BRUNSWICK.....	18,089	25,496	19,276	27,246
ONTARIO—				
Petrolia and Enniskillen.....	57,960	123,531	58,273	120,229
Oil Springs.....	33,853	75,580	32,283	69,728
Moore Township.....	2,253	4,805	1,398	2,852
Sarnia Township.....	445	949	595	1,227
Plympton Township.....	237	505	191	394
Bothwell Township.....	40,425	86,229	40,449	83,399
West Dover.....	10,498	22,388	8,801	18,145
Onondaga.....	728	1,908	878	1,882
Mosa Township.....	8,686	18,524	13,527	27,888
Brooke.....	773	1,649	101	208
Dunwich.....	303	646	195	402
Raleigh and Tilbury East.....	2,471	5,270	207	427
Thamesville.....	683	1,457	1,990	4,103
Dawn and Euphemia.....	5,890	12,559	5,416	11,166
Warwick.....			8,310	17,132
Chatham.....			27	56
Total for Ontario.....	165,205	356,000	172,641	359,268
ALBERTA—				
Turner Valley.....	2,721,218	4,932,051	6,703,548	8,736,664
Red Coulee-Border-Keho (light crude).....	13,782	16,008	14,157	12,742
Wainwright-Skiff (heavy crude).....	14,085	12,943	18,229	15,461
Taber-Moose Dome.....			15,378	10,227
Total for Alberta.....	2,749,085	4,961,002	6,751,312	8,775,094
NORTHWEST TERRITORIES.....	11,371	56,855	22,855	68,565
Canada.....	2,943,750	5,399,353	6,966,084	9,230,173

Table 194.—Petroleum Wells in Canada, by Provinces, 1936-1938

	New Brunswick	Ontario	Alberta	Canada
Productive wells at beginning of year.....	1936 23	2,109	122 (a)	2,256
	1937 23	2,079	129 (a)	2,233
	1938 23	2,082	157 (a)	2,264
Number of productive wells drilled.....	1936 21	10	31	31
	1937 1	38	28	67
	1938 1	56	43	100
Number of wells abandoned.....	1936 253	43	1	254
	1937 1	65	.....	69
	1938 1	28	.....	31
Number of dry wells drilled.....	1936 20	3	23	23
	1937 28	6	34	34
	1938 41	7	48	48
Number of productive wells in operation at end of year.....	1936 23	2,079	129 (a)	2,233
	1937 23	2,082	157 (a)	2,264
	1938 23	2,110	195 (a)	2,330

(a) Includes 2 wells in the Northwest Territories.

Table 195.—Imports into Canada of Petroleum, Asphalt and Their Products, 1938

	Quantity	Value
		\$
Oil, imported by miners or mining companies or concerns, for use in the concentration of ores of metals in their own concentrating establishments.....imp. gal.	69,593	33,485
Crude petroleum not subjected to any other process than natural weathering and removal of foreign matter and water when imported by oil refiners to be refined in their own factories, 8155 specific gravity (42.0° A.P.I.) or heavier at 60° Fahrenheit.....imp. gal.	1,226,340,000	40,971,668
Crude petroleum not subjected to any other process than natural weathering and removal of foreign matter and water, when imported by oil refiners to be refined in their own factories, lighter than 8155 specific gravity (42.0° A.P.I.) at 60° Fahrenheit.....imp. gal.	1,750,735	78,558

Table 195.—Imports into Canada of Petroleum, Asphalt and Their Products, 1938—Con.

	Quantity	Value
		\$
Crude petroleum, n.o.p.....	imp. gal.	469,574
Fuel oil, ex-warehoused for ships' stores.....	imp. gal.	31,198,446
Coal oil and kerosene lighter than .8236 specific gravity at 60° temperature, n.o.p.....	imp. gal.	4,723,576
Engine distillate .8017 specific gravity or heavier at 60° temperature.....	imp. gal.	1,142,847
Gasoline lighter than .8236 specific gravity at 60° temperature.....	imp. gal.	71,624,855
Natural casinghead, compression or absorption gasoline, lighter than .6690 specific gravity (80.0° A.P.I.) at 60° Fahrenheit, when imported by refiners of crude petroleum for blending with gasoline wholly produced in Canada.....	imp. gal.	47,413,265
Lubricating oils, composed wholly or in part of petroleum, and costing less than 25 cents per gallon.....	imp. gal.	13,020,226
Lubricating oils, n.o.p.....	imp. gal.	3,153,200
All other oils, n.o.p.....	imp. gal.	187,525
Products of petroleum, n.o.p., .8236 specific gravity (40.3° A.P.I.) or heavier at 60° Fahrenheit.....	imp. gal.	20,075,353
Petroleum lubricating oil, .8236 specific gravity (40.3° A.P.I.) or heavier at 60° Fahrenheit, when imported by manufacturers of petroleum white oils of medicinal and technical grades, for use exclusively in the manufacture of such oils in their own factories, provided that the imported oil is to be processed with fuming sulphuric acid (20 per cent oleum) in such proportions that not less than 5 parts of acid to 100 parts of oil by weight shall be used.....	imp. gal.	292,539
Petroleum greases and lubricating greases.....	lb.	5,588,079
Refined petroleum jellies and oils, for toilet, medicinal, edible or similar purposes.....	\$	233,267
Paraffin wax.....	lb.	13,868,469
Paraffin wax candles.....	lb.	186,525
Products of petroleum, n.o.p., lighter than .8236 specific gravity at 60° temperature.....	imp. gal.	3,869,992
Liquefied petroleum gases for heating, cooking or illuminating purposes when imported in containers.....	\$	12,150
Asphaltum or asphalt, solid or not.....	cwt.	296,125
Asphaltum oil for paving purposes only.....	imp. gal.	41,062
Coke, petroleum.....	tons	81,384
Total Petroleum, Asphalt and Their Products.....	\$	56,235,585

Table 196.—Exports of Petroleum and Its Products, 1938

	Quantity	Value
		\$
Oil, petroleum, crude.....	imp. gal.	1,125
Oil, coal and kerosene, refined.....	imp. gal.	767,763
Oil, gasoline and naphtha.....	imp. gal.	4,984,879
Fuel oil.....	imp. gal.	1,847,017
Oil, mineral, n.o.p.....	imp. gal.	806,041
Wax, mineral.....	cwt.	289
Coke, petroleum.....	tons	11,370
Total—Petroleum and Its Products.....	\$	1,125,853
RE-EXPORTS		
Petroleum and its products.....	\$	13,138
Petroleum coke.....	tons	14,038
Total—Re-Exports.....	\$	307,713

Table 197.—Capital Employed in the Petroleum Industry in Canada, by Provinces,* 1937 and 1938

	1937			1938		
	Ontario	Alberta	Canada†	Ontario	Alberta	Canada†
	\$	\$	\$	\$	\$	\$
CAPITAL EMPLOYED AS REPRESENTED BY—						
Cost of lands, buildings, plant, machinery and tools.....	910,885	34,253,949	35,221,074	954,783	42,504,310	43,531,333
Cost of supplies and stocks on hand.....	7,061	937,436	965,857	11,382	749,726	788,165
Cash, trading and operating accounts and bills receivable.....	17,972	5,864,130	5,960,590	22,014	7,223,235	7,365,540
Total.....	935,918	41,055,515	42,147,521	988,179	50,477,271	51,685,038

* Data for New Brunswick included in the "Natural Gas Industry."

† Includes data for the Northwest Territories.

Table 198.—Employees, Salaries and Wages in the Petroleum Industry in Canada, by Provinces,† 1937 and 1938

Province	*Average number of employees				Salaries and wages		
	Salaried employees		Wage-earners	Total	Salaries	Wages	Total
	Male	Female					
1937					\$	\$	\$
Ontario.....	13	3	193	209	20,085	122,300	142,385
Alberta†.....	163	38	1,210	1,411	336,808	1,861,166	2,197,974
Canada.....	176	41	1,403	1,620	356,893	1,983,466	2,340,359
1938							
Ontario.....	13	3	238	254	18,990	125,575	144,565
Alberta†.....	222	44	1,374	1,640	478,527	2,033,020	2,511,547
Canada.....	235	47	1,612	1,894	497,517	2,158,595	2,656,112

* See footnote on page 00.

† Data for New Brunswick included in the "Natural Gas Industry."

‡ Data for Northwest Territories included with Alberta.

Table 199.—Casing Used in the Petroleum Industry in Canada, 1938

Size	Weight	Length	Size	Weight	Length
Inches	Pounds	Feet	Inches	Pounds	Feet
3½.....	3,705	741	10½.....	2,099,407	47,336
4.....	1,311	138	13.....	110,400	2,208
4½.....	3,780	270	13½.....	1,191,256	22,013
5½.....	71,200	3,560	13¾.....	111,726	2,069
5.....	1,104	138	15½.....	14,700	196
5½.....	73,780	4,340	16.....	608,660	8,914
6.....	455,140	20,344	18.....	14,175	162
6½.....	4,466,732	159,893	18½.....	73,456	839
7.....	2,975,454	106,266	20.....	14,350	187
8.....	81,978	2,922	21.....	4,890	54
8½.....	516,384	14,344	21½.....	4,048	50
9.....	1,182,480	29,562	21¾.....	12,950	140
10.....	764,740	17,919	24.....	21,120	192
10½.....	83,880	1,864			
			Total.....	14,963,376	446,661

Table 200.—World Production of Crude Petroleum, 1937 and 1938

(Supplied by the Imperial Institute)

Countries	1937	1938	Countries	1937	1938
BRITISH EMPIRE			FOREIGN COUNTRIES—CONC.		
United Kingdom (c) (estimated).....	124,000	129,000	Roumania.....	7,036,722	6,499,000
Canada (b).....	372,627	881,783	U.S.S.R.....	27,380,000	28,403,000
Barbados.....	284	224	Yugoslavia.....	427	1,020
Trinidad (b).....	2,123,097	2,429,754	Algeria.....	275	255
Bahrein Islands (b).....	1,108,900	1,044,000	Egypt.....	168,162	222,171
Brunei.....	566,908	695,904	Morocco (French).....	2,437	3,151
Burma (b).....	1,060,480	1,018,623	Mexico (b).....	7,107,100	5,271,800
India (b).....	292,115	336,225	United States (b).....	172,859,800	163,953,200
Sarawak.....	209,894	199,584	Argentina (d).....	2,299,275	2,400,718
New Zealand.....	549	481	Bolivia.....	17,589	19,330
Australia (Victoria).....	38	25	Colombia (b).....	2,858,000	3,162,000
Total.....	5,860,000	6,740,000	Ecuador.....	313,606	326,616
FOREIGN COUNTRIES			Peru.....	2,272,059	2,100,000
Albania.....	70,000	100,000	Venezuela.....	27,295,907	27,628,000
Austria.....	32,380	62,466	Formosa (estimated).....	6,000	(a)
Czecho-Slovakia.....	17,675	19,000	Iran.....	10,167,795	10,195,371
Estonia (shale oil).....	110,126	137,426	Iraq.....	4,187,826	4,294,449
France (c).....	76,086	78,625	Japan (b).....	339,500	350,000
Germany.....	443,912	543,355	Netherlands East Indies.....	7,147,996	7,280,936
Hungary (c).....	2,179	42,122	Sakhalin (U.S.S.R.).....	211,500	(a)
Italy (c).....	14,124	13,011	Saudi Arabia.....	8,000	66,000
Poland.....	496,000	499,000	Total.....	273,000,000	264,000,000
			World's Total.....	279,000,000	271,000,000

(a) Information not available.

(b) The following conversion rates have been used: 35 gallons=1 barrel, and the undermentioned barrels=1 ton:—Canada, 7·9; Trinidad, 7·3; Bahrein Islands, 7·0; Burma, 7·4; India, 7·4; Mexico, 6·6; United States, 7·4; Colombia, 7·1; Japan, 7·2.

(c) Including shale oil.

(d) Converted from cubic metres at the rate of 1 cubic metre=.8843 long tons.

2. PETROLEUM PRODUCTS INDUSTRY IN CANADA

The 47 petroleum refineries which operated during 1938 were distributed as follows—14 in Alberta, 12 in Saskatchewan, 5 in Quebec, 5 in Ontario, 5 in Manitoba, 3 in British Columbia, and 1 in each of Nova Scotia, New Brunswick and Northwest Territories. Compared with 1937 there was a gain of 6 refineries in Alberta, 2 in Manitoba and a loss of 5 in Saskatchewan, while in the other provinces the number remained unchanged. The operating refineries had a capacity of 181,335 barrels of crude oil per day, distributed by provinces as follows—Quebec, 65,500 barrels or 36.1 per cent, Ontario 41,500 barrels or 22.9 per cent, British Columbia 22,500 barrels or 12.4 per cent, Nova Scotia 20,000 barrels or 11.0 per cent, Saskatchewan 14,475 barrels or 8.0 per cent, Alberta 13,600 barrels or 7.5 per cent, Manitoba 3,360 barrels or 1.9 per cent and New Brunswick and the Northwest Territories the remainder. Fifteen establishments reported cracking units in use with aggregate capacity of about 86,660 barrels per day.

In 1938 operating refineries used 1,182,166,964 gallons of imported crude oil and 236,492,200 gallons of crude oil, naphtha and absorption gasoline from Canadian wells, a total of 1,418,659,164 gallons which was equal to about 61 per cent of Canada's refinery capacity. About 60.7 per cent, or 860,937,283 gallons, was imported from the United States, 22.6 per cent, or 321,229,681 gallons, was brought in from other countries and 16.7 per cent, or 236,492,200 gallons was from Canadian sources. The total cost at the refineries of all crude oil and naphtha, charged to stills during the year was \$70,880,052. Stocks of crude and naphtha held at the refineries at the end of the year totalled 162,860,929 gallons.

Gasoline production in 1938 amounted to 654,029,125 gallons of which 362,583,649 gallons were made by the straight run process and 291,445,476 gallons by cracking. In addition, the refineries used for blending purposes a total of 47,265,103 gallons of imported casinghead gasoline, which was not included in the production figures. The gallonage of gasoline made in 1938 was the highest on record being 2 per cent greater than the output in 1937 which in turn was 15 per cent over 1936. The value of the 1938 production was \$58,649,032 at refinery prices. Stocks held at the refineries at the end of the year included 87,103,588 of straight run and cracked gasoline and 6,828,407 gallons of imported casinghead gasoline.

Imports of gasoline, including casinghead during 1938 amounted to 119,038,120 gallons which, with the production of 654,029,125 plus the reduction in refinery stocks of 1,844,503 gallons and less the exports of 4,984,879 gallons, made an apparent consumption in Canada of 769,926,869 gallons for the year. The actual sales as reported to the Provincial Governments under the Gasoline Tax Acts amounted to only 762,592,300 gallons.

Production in Canadian refineries of fuel and gas oils (excluding any made and used for cracking purposes) totalled 540,907,971 gallons of which 482,354,265 gallons were for sale and 58,553,706 gallons for use as fuel in the refineries. Imports aggregated 51,273,799 gallons and exports amounted to 1,847,017 gallons. Refinery stocks at the end of the year were about 82,751,563 gallons or 2,325,053 gallons less than in 1937. The apparent consumption in Canada, as calculated from the above figures, was 592,659,806 gallons.

The output of tractor and engine distillate was 35,002,461 gallons in 1938 and imports amounted to 1,142,847 gallons. Stocks at refineries increased 4,115,975 gallons. The apparent Canadian consumption was 32,029,333 gallons.

Refinery production of lubricating oils was 21,617,349 gallons and the output from the blending plants was 1,091,652 gallons, making a total production in Canada of 22,709,001 gallons. By adding to this figure the imports of 16,173,426 gallons and deducting the increase in refinery stocks of 132,899 gallons, an estimate of 38,749,528 gallons is obtained as the Canadian consumption in 1938.

Production of lubricating grease in refineries was 13,658,233 pounds and in the blending plants, 612,876 pounds, a total of 14,261,109 pounds. The latter quantity plus imports of 5,588,079 pounds indicates a consumption in Canada of 19,849,188 pounds for all purposes in 1938.

Capital employed in the petroleum refining industry in 1938 was reported at \$62,097,038 of which \$33,424,781 was the value placed on lands, buildings and equipment. The average number of employees was 4,586 and payments to these workers in salaries and wages was \$7,750,746. Materials used in refining operations cost \$75,993,557, fuel and electricity cost \$4,678,933 and products were valued at \$96,121,611.

Table 201.—Materials Used by the Oil Refineries of Canada, 1937 and 1938

	1937		1938	
	Quantity	Cost at works	Quantity	Cost at works
		\$		\$
MATERIALS USED—				
<i>Petroleum refining—</i>				
Crude oil (under 60° A.P.I.) in its natural state, from Canadian wells..... imp. gal.	65,719,569	3,792,682	217,105,125	10,807,043
Crude naphtha (60° A.P.I. and over) in its natural state, from Canadian wells..... imp. gal.	6,026,194	467,393	12,035,820	746,679
Absorption gasoline, etc., from Canadian wells (run to stills)..... imp. gal.	18,258,906	1,340,076	7,351,255	496,303
Crude oil, in its natural state, imported (run to stills)—				
(a) From United States..... imp. gal.	994,420,631	53,060,003	860,931,586	44,761,798
(b) From other countries..... imp. gal.	349,135,949	16,674,628	321,229,681	14,067,659
Crude oil, not in its natural state (run to stills)—				
(a) From United States..... imp. gal.	20,445	818	5,697	570
Benzol for blending..... imp. gal.	1,949,894	310,461	2,061,032	327,458
Phenol..... lb.			172,535	26,690
Sulphuric acid, 66° Bé..... lb.	23,086,547	204,255	19,874,862	194,046
Sulphur..... lb.	190,956	6,776	280,060	8,128
Caustic soda..... lb.	5,770,872	131,928	4,309,264	130,565
Soda ash..... lb.	347,273	7,289	424,431	8,915
Litharge..... lb.	474,545	40,747	499,921	36,240
Fullers' earth and clay..... lb.	18,843,458	240,309	19,687,467	281,668
Compounding materials..... \$		652,084		482,055
Tetraethyl fluid..... \$		2,136,547		2,677,961
Other materials..... \$		254,289		207,325
Shipping containers..... \$		673,687		732,454
Total..... \$		79,993,972		75,993,557
<i>Lubricating oils and greases—Total..... \$</i>		<i>407,908</i>		<i>425,959</i>
Grand Total..... \$		80,401,880		76,419,516

Table 202.—Products Made by the Oil Refining Industries of Canada, 1937 and 1938

	1937		1938	
	Quantity	Gross selling value at works	Quantity	Gross selling value at works
		\$		\$
PRODUCTS MADE—				
<i>Petroleum refining—</i>				
Made for sale—				
Gasoline—Straight run (1)..... imp. gal.	361,722,399	33,473,233	362,448,896	32,969,483
By cracking process..... imp. gal.	278,362,079	25,073,645	291,422,445	25,664,662
Stove oil (40°-42-5° A.P.I.)..... imp. gal.	18,014,276	826,880	14,429,501	652,935
Gas and light fuel oil (20°-40° A.P.I., except diesel)..... imp. gal.	100,585,222	4,754,065	86,884,950	4,157,448
Diesel fuel oil (all fuel oil sold under this name)..... imp. gal.	41,503,283	1,808,621	50,731,677	2,240,724
Residual fuel oil (10°-20° A.P.I.)..... imp. gal.	329,082,501	11,953,010	330,308,137	11,447,994
Tractor and engine distillate..... imp. gal.	30,319,024	2,915,840	35,002,461	2,873,639
V.M. and P. or solvent naphtha..... imp. gal.	11,326,568	980,207	7,144,996	583,507
Kerosene..... imp. gal.	26,308,522	2,395,293	22,518,046	2,109,211
Lubricating oil..... imp. gal.	22,875,067	3,996,812	21,543,098	4,123,954
Lubricating grease..... imp. gal.	13,899,436	511,426	13,658,233	669,514
Asphalt..... imp. gal.	56,811,878	4,336,778	54,914,869	3,979,788
Petroleum coke..... short ton	59,634	371,198	63,375	388,753
Other products..... \$		479,038		219,895
Total—Made for sale..... \$		93,876,046		92,081,507
Made for own use—				
Gasoline—Straight run..... imp. gal.	177,998	17,643	134,753	11,743
By cracking process..... imp. gal.	37,400	3,827	23,031	3,144
Gas and light fuel oil (20°-40° A.P.I.)..... imp. gal.	239,631	11,835	1,653,587	61,525
Residual fuel oil (10°-20° A.P.I.)..... imp. gal.	54,684,126	2,100,864	56,882,008	2,102,252
Kerosene..... imp. gal.	41,127	3,275	18,379	1,562
Lubricating oil..... imp. gal.	77,735	13,719	74,251	13,701
Tar..... lb.	1,381,625	55,265	624,708	27,764
Asphalt..... imp. gal.	50,305	3,960	65,058	4,879
Petroleum coke..... short ton	2,381	8,942	634	1,547
Still gas..... M cu. ft.	6,199,110	1,442,749	6,486,618	1,615,350
Other products..... \$		163,829		196,637
Total—Made for own use..... \$		3,825,908		4,040,104
Total Petroleum refining..... \$		97,701,954		96,121,611
Fuel and gas oils made for use in cracking process..... imp. gal.	535,969,764		497,513,602	
<i>Lubricating oils and greases—</i>				
Greases, lubricating..... lb.	902,251	131,766	602,876	93,021
Oils, lubricating..... gal.	914,727	568,651	1,091,652	679,188
Soaps and soap powders..... lb.		37,505		30,748
All other products..... \$		14,138		78,779
Total lubricating oils and greases..... \$		752,060		881,736

(1) Includes Turner Valley naphtha and natural gasoline run to refinery stills but does not include the imported casing head gasoline which was used for blending at the refineries.

CHAPTER EIGHT

THE NON-METALLIC MINING INDUSTRIES IN CANADA. (Other than Fuels)

Including detailed data relating to operations in the following industries:—

Asbestos	Miscellaneous	Magnetitic dolomite
Feldspar, Nepheline	Barytes	Magnesium sulphate
Syenite and Quartz	Diatomite	Mineral waters (natural)
Gypsum	Fluorspar	Phosphate
Iron oxides (ochre)	Garnet	Pyrites (sulphur)
Mica	Graphite	Silica brick
Salt	Grindstones, etc.	Sodium carbonate
Talc and soapstone	Lithium minerals	Sodium sulphate
		Strontium minerals

THE ASBESTOS MINING INDUSTRY, AND THE ASBESTOS PRODUCTS INDUSTRY

A—The Asbestos Mining Industry

Production (mine sales) of primary asbestos in Canada in 1938, including all grades, totalled 289,793 short tons valued at \$12,890,195 compared with the record output of 410,026 short tons at \$14,505,791 in 1937. Production in 1938 came entirely from mines operated in the Eastern Township of the Province of Quebec.

The average price per ton for all grades of asbestos shipped from Canadian mines in 1938 was \$44.48 compared with \$35.38 in 1937 and \$33.05 in 1936. Increases in prices over 1937 were recorded for all grades; the average price per ton for all crudes increased from \$246.47 in 1937 to \$328.21 in 1938. Fibres increased from \$51.11 in 1937 to \$59.54 and shorts and short fibres to \$17.96 from \$16.13 in the preceding year.

Exports of asbestos, including manufactures thereof, from Canada in 1938 were valued at \$13,316,558 compared with \$14,545,370 in 1937. Of the 1938 exports those to the United Kingdom were appraised at \$1,461,618 and those to the United States at \$5,129,552.

The number of Canadian asbestos mining companies reported as active in 1938 totalled 8; capital employed in the industry amounted to \$22,008,771; employees numbered 3,711 against 3,842 in 1937, and salaries and wages distributed aggregated \$4,024,363 compared with \$4,232,507 in the preceding year.

In the Province of Quebec during 1938 the Asbestos Corporation, Limited, operated four of its asbestos properties; the King, whence comes the main production, the Beaver, the British Canadian, and the Vimy Ridge Mines. Johnson's Company worked its two mines, situated at Thetford and Black Lake respectively, and did some work on an asbestos property near the Beaver mine, with good results. Bell Asbestos Mines, Quebec Asbestos Corporation and Canadian Johns-Manville operated normally.

The only other asbestos mining operations reported in Canada in 1938 were those conducted in the Matachewan district of Northern Ontario by Rahn Lake Mines Corporation, Ltd.; underground work at the property of this Company was carried on from July to the close of the year but no commercial shipments of asbestos were made.

The British Columbia Department of Mines annual report for 1938 records that asbestos is found in serpentine at the head of Elmore Gulch and in the lower canyon of Germansen river, North-Eastern District.

Canadian asbestos as produced commercially in Quebec is of the chrysotile or serpentine variety and is of high quality. Reserves of milling grade asbestos rock have been reported as sufficient for many years of commercial fibre production. Production of asbestos in Canada from 1880 to 1938, inclusive, totalled 6,565,896 short tons valued at \$239,158,297.

The 21st annual report of the National Research Council of Canada for the fiscal year 1937-1938 states that laboratory work on the production of asbestos fibre suitable for filtration purposes has been completed and filtration tests on the materials produced have been made. Arrangements for the industrial production of fibre for filtration purposes from Canadian mill fibre were under negotiation during the latter part of the year under review. An investigation of the thermal dehydration of asbestos fibre was begun, the effect of both temperature and time of heating being studied. One phase of this work was completed, but it was decided to extend the investigation to include the various types of asbestos and the effect of dehydration on their physical properties. Work has been done on the utilization of short fibre and of tailings or waste rock and some interesting results have been obtained. A method was developed for making Canadian asbestos paler in colour in order to render it suitable for a special manufacturing purpose.

Table 203.—Sales and Shipments* of Canadian Asbestos, 1937 and 1938

	1937		1938	
	Tons	\$	Tons	\$
Crudes.....	(b) 3,846	947,917	2,911	955,423
Fibres.....	200,247	10,235,820	163,097	9,710,899
Shorts.....	205,933	3,322,054	123,785	2,223,873
Total.....	410,026	14,505,791	289,793	12,890,195
Sand, gravel, and stone (waste rock only) (a).....	3,980	3,301	3,279	2,464

(*) All from the province of Quebec in 1938.

(a) This production is included under the sand and gravel industry.

(b) Includes 1 ton valued at \$250 produced in Ontario in 1937.

Table 204.—Asbestos Rock Mined and Milled, 1937-1938

	1937	1938
	Tons	Tons
Quantity of rock mined.....	6,477,805	5,816,368
Quantity of rock milled.....	5,440,607	4,874,548

Table 204.—Sales and Shipments of Asbestos, 1929-1938

Year	Tons	\$	Year	Tons	\$
1929.....	306,055	13,172,581	1934.....	155,980	4,936,326
1930.....	242,114	8,390,163	1935.....	210,467	7,054,614
1931.....	164,296	4,812,886	1936.....	301,287	9,958,183
1932.....	122,977	3,039,721	1937.....	410,026	14,505,791
1933.....	158,367	5,211,177	1938.....	287,793	12,890,195

Prices, 1938.—All prices for asbestos are quoted on a short-ton basis. Canadian prices are f.o.b. Quebec mines, tax and bags included; Rhodesian, South African, and Russian, c.i.f. New York; and Vermont prices, f.o.b. mines, Vermont.

According to quotations in Metal and Mineral Markets, published by the McGraw-Hill Publishing Co., Inc., New York City, prices of Canadian asbestos were as follows: Crude No. 1, \$700-\$750; Crude No. 2 and sundry crudes, \$150-\$350; spinning fibres, magnesia, and compressed sheet fibres, \$110-\$200; shingle stock, \$57-\$77 (\$78 in December); paper stock, \$40-\$45; cement stock, \$21-\$25; floats, \$18-\$20; and shorts, \$12-\$16.50.

Rhodesian Crude No. 1 was quoted at \$275 and Crude No. 2 at \$250 until March, when the prices were advanced to \$300 and \$260, respectively.

South African prices quoted since March, 1938, are as follows: Amosite; Grade B 1 (white), \$140; Grade B 3 (dark), \$120. Transvaal Blue: Grade B (long fibre), \$450; Grade S (short fibre), \$140.

Russian Crude AA was quoted at \$750; Crude No. 1, \$275; Crude No. 2, \$240; and shingle stock, \$67.50 and up.

Vermont prices were constant throughout the year as follows: Shingle stock, \$57; paper stock, \$40; cement stock, \$25; and shorts and floats, \$12-\$18.

Table 205.—Consumption of Asbestos in Specified Canadian Industries, 1937 and 1938

Industry	1937		1938	
	Quantity	Cost at works	Quantity	Cost at works
		\$		\$
Electric Apparatus and Supplies—				
Board.....	lb. 232,034	34,226	178,401	32,477
Yarn.....	lb. 119,140	37,323	71,851	27,424
Tape.....	lb.	16,730	14,945	13,602
Boilers, Tanks and Engines.....	\$	3,914		7,309
Asbestos Products—				
Fibre.....	See Table 210—Asbestos Products Industry			
Other forms.....				
Roofing paper.....	ton 2,430	168,334	1,743	73,140
Cotton goods, n.e.s.....	lb. 10,252	539	20,171	1,050
Woollen goods, n.e.s.....	lb. 165,027	49,505	127,321	35,649

Table 206.—Imports Into Canada and Exports of Asbestos, 1938

	1938	
	Tons	\$
IMPORTS		
Asbestos brake and clutch lining.....		93,470*
Asbestos brake linings for automobiles, motor vehicles and chassis.....		150,410†
Asbestos brake linings and clutch facings, n.o.p.....		13,157†
Asbestos in any form other than crude, and all manufactures of, n.o.p.....		551,989
Asbestos packing.....	47	45,866
Asbestos clutch facings for automobiles, motor vehicles and chassis.....		26,659†
Total Imports.....		911,551
EXPORTS		
Asbestos—Total Exports.....	165,744	10,872,435
To—United Kingdom.....	19,996	1,271,974
United States.....	54,323	3,125,401
Czechoslovakia.....	3,388	285,609
Australia.....	6,358	402,361
Belgium.....	10,576	684,535
France.....	8,590	579,730
Germany.....	25,980	2,582,351
Italy.....	4,111	301,857
Japan.....	27,089	1,334,821
Netherlands.....	470	20,693
China.....	900	36,000
Poland and Danzig.....	916	78,999
Sweden.....	1,900	125,168
New Zealand.....	120	7,920
Chile.....	310	18,600
Denmark.....	60	7,800
Portugal.....	6	206
Asbestos sand and waste—Total Exports.....	123,143	2,237,751
To—United Kingdom.....	4,936	103,453
United States.....	112,544	2,063,429
Belgium.....	382	7,569
France.....	855	18,950
Germany.....	3,071	75,035
Netherlands.....	225	4,849
Japan.....	348	9,208
Poland and Danzig.....	300	7,200
Asbestos manufactures, including asbestos roofing—Total Exports.....		206,372
To—United Kingdom.....		86,191
United States.....		722
Newfoundland.....		6,773
Australia.....		49,955
New Zealand.....		2,537
Argentina.....		9,162
Brazil.....		9,440
Chile.....		827
Colombia.....		4,896
Mexico.....		8,483
Peru.....		3,332
France.....		5,355
Total Asbestos Exports.....		13,316,558
To—United Kingdom.....		1,461,618
United States.....		5,129,552

* To March 31, 1938.

† From April 1, 1938.

Table 207.—Capital Employed in the Asbestos Industry in Canada, 1938

	\$
Capital employed as represented by:—	
(a) Present cash value of the land (excluding minerals).....	8,788,553
(b) Present value of buildings, fixtures, machinery, tools and other equipment.....	7,065,067
(c) Inventory value of materials on hand, ore in process, fuel and miscellaneous supplies on hand.....	606,892
(d) Inventory value of finished products on hand.....	1,427,890
(e) Operating capital (cash, bills and accounts receivable, prepaid expenses, etc.).....	4,120,369
Total.....	22,008,771

Table 208.—Principal Statistics of the Asbestos Mining Industry in Canada, 1937 and 1938

	1937	1938
Number of firms.....	10	8
Capital employed..... \$	21,249,676	22,008,771
Number of employees—On salaries (c).....	321	313
On wages.....	3,521	3,398
Total.....	3,842	3,711
Salaries and wages—Salaries..... \$	522,213	584,792
Wages..... \$	3,710,294	3,439,571
Total..... \$	4,232,507	4,024,363
Selling value of products (a)..... \$	14,509,092	12,892,659
Cost of fuel and electricity (purchased)..... \$	1,346,434	1,298,089
Cost of process supplies (b)..... \$	2,729,801	1,889,636
Net value of sales..... \$	10,432,857	9,704,934

(a) Includes value of sand and gravel.

(b) Explosives, drill steel, etc.

(c) In 1937 includes 41 females; and 41 in 1938.

Table 209.—Wage-earners Employed, by Months, in the Asbestos Mining Industry in Canada, 1937-1938

Month	1937	1938		Mill
	Total	Mine		
		Surface	Underground	
January.....	3,096	1,523	419	1,395
February.....	3,028	1,493	451	1,458
March.....	3,311	1,428	451	1,452
April.....	3,541	1,389	460	1,500
May.....	3,656	1,436	432	1,561
June.....	3,764	1,410	434	1,566
July.....	3,756	1,336	412	1,514
August.....	3,804	1,406	454	1,534
September.....	3,767	1,402	434	1,562
October.....	3,585	1,476	448	1,581
November.....	3,490	1,475	447	1,613
December.....	3,413	1,528	412	1,472

THE ASBESTOS PRODUCTS INDUSTRY, 1938

Production in the asbestos products industry during 1938 was valued at \$1,531,118, a decline of 12 per cent from the \$1,896,677 of 1937 which in turn was 47 per cent over the 1936 total of \$1,293,909. Among the lines made from asbestos during the year were brake linings worth \$478,834, boiler and pipe covering at \$145,621, clutch facings at \$117,082, packings at \$93,689, dryer felts, paper, gaskets, cloth, shingles, refractory cements, blackboards and millboard. Other lines made included mineral wool and eel grass insulation, rubber hose, brass rivets and packings of rubber, duck and flax.

A total of 13 plants operated in this industry of which 6 were located in Quebec, 6 in Ontario and 1 in Nova Scotia. Capital employed by these concerns amounted to \$1,701,202, employment was afforded to a monthly average of 403 people who received \$433,964 in salaries and wages, expenditures for materials used in manufacturing processes cost \$614,207 and \$107,436 was paid out for fuel and electricity.

Table 210.—Materials Used in the Manufacture of Asbestos Products, 1937 and 1938

Material	Unit of measure	1937		1938	
		Quantity	Cost at works	Quantity	Cost at works
			\$		\$
Asbestos fibre.....	lb.	11,788,087	209,871	5,841,692	110,077
Asbestos cloth.....	lb.	30,477	10,073	64,027	23,529
Asbestos paper, corrugated and plain.....	lb.	123,913	5,444	146,626	6,734
Asbestos sheets and strips.....	lb.	57,284	12,851	21,529	8,728
Asbestos yarn.....	lb.	295,470	77,579	230,777	66,859
Cotton cloth and yarn.....	\$		68,286		43,578
Rubber and rubber sheets.....	lb.	94,525	19,474	89,278	14,943
Containers and packing material.....	\$		81,566		63,514
All other materials.....	\$		327,495		276,245
Total.....	\$		812,639		614,207

Table 211.—Products Manufactured in the Asbestos Products Industry, 1937 and 1938

Product	Unit of measure	1937		1938	
		Quantity	Cost at works	Quantity	Cost at works
			\$		\$
Asbestos brake linings—Moulded.....	ft.	2,263,300	391,919	1,859,377	330,726
Other.....	ft.	1,449,744	188,568	1,197,453	148,108
Asbestos boiler and pipe covering.....	ft.	2,028,782	212,341	1,619,599	145,621
Asbestos cloth.....	lb.	10,806	6,795		4,903
Asbestos clutch facings.....	No.	557,916	126,124	529,766	117,082
Asbestos gaskets.....	lb.	39,380	23,167	33,733	21,900
Asbestos packings of all kinds.....	lb.	433,083	131,213	253,475	93,689
Asbestos paper.....	lb.	2,413,150	85,437	1,569,427	58,286
All other products (*)......	\$		731,113		610,803
Total.....	\$		1,896,677		1,531,118

(*) Includes products made by 1 firm such as rockwool, asbestos dryer felt, hydraulic brake hose, asbestos shingles, asbestos yarn, packings of rubber, duck and flax, etc.

Table 212.—World Production of Asbestos, 1937-1938

(Supplied by Imperial Institute)
(Long tons)

Producing Country and Description	1937	1938	Producing Country and Description	1937	1938
BRITISH EMPIRE			FOREIGN COUNTRIES		
Southern Rhodesia.....	50,905	52,509	Czecho-Slovakia.....	(a)	(a)
Uganda.....		52	Finland.....	7,500	(a)
Union of South Africa—			France.....	200	(a)
Amosite.....	5,808	7,850	Greece.....	2	(a)
Blue.....	4,686	7,841	Italy.....	6,292	6,752
Chrysotile.....	15,049	4,977	U.S.S.R.....	(a)	(a)
Anthophyllite.....	22		United States (sales)—		
Canada—			Chrysotile.....	11,861	11,519
Chrysotile (b).....	369,648	261,746	Amphibole.....	546	
Crude.....	3,434	2,598	Bolivia.....	21	21
Fibre.....	178,792	145,698	Venezuela.....	(a)	(a)
Shorts.....	183,869	110,522	French Indo-China.....		
Sand and gravel (waste rock only).....	3,553	2,928	Japan (estimated).....	1,000	1,000
Cyprus.....	11,173	9,032	Korea.....	69	(a)
India.....	100	89	Turkey.....	155	657
Australia.....	298	173			
Total.....	458,000	344,000	Total.....	(a)	(a)
			World's Total.....	(a)	(a)

Asbestos is also produced in China.

(a) Information not available. (b) Sales and shipments.

FELDSPAR AND QUARTZ MINING INDUSTRY

Owing to the very close physical association of these minerals in many Canadian deposits (pegmatites), it has been found difficult for some operators to make a separation of all data pertaining to the mining of each individual mineral and, for this reason, the general statistics relating to capital, employment, fuel and electricity, etc., have been combined. Since 1936 corresponding statistics relating to the production of nepheline-syenite have been included with those pertaining to the commercial productions of feldspar and quartz.

During 1938 the gross value of production by the industry and including the value of feldspar, quartz and nepheline-syenite sold totalled \$1,233,647 compared with corresponding values of \$1,428,714 in 1937 and \$789,682 in 1936. In 1938 commercial shipments of feldspar were made only from properties located in Ontario, Manitoba and Quebec; quartz in various forms was produced in Nova Scotia, Quebec, Ontario and Saskatchewan while production of nepheline-syenite was confined to the province of Ontario.

The number of firms reported as active in the industry in 1938 totalled 32, capital employed was recorded at \$1,605,136, employees numbered 375, salaries and wages paid amounted to \$342,248 and the value of fuel, electricity and process supplies consumed totalled \$168,509. The net value of all products sold was estimated at \$1,065,138 compared with \$1,242,244 in 1937.

FELDSPAR

During the year under review commercial mine shipments of crude feldspar were made in Quebec from 15 properties located in Derry and Buckingham townships, Papineau county and in Ontario from Bathurst township, Lanark county, Murchison township, Renfrew county and Sabine township, district of Nipissing. The relatively small production recorded for Manitoba in 1938 came from Pointe du Bois in the Lac du Bonnet district of Eastern Manitoba.

In 1938 feldspar was ground, for industrial consumption, in mills located at Kingston, Ontario and Buckingham, Quebec.

The Bureau of Mines, Ottawa, reports that pegmatite dykes, the main source of commercial feldspar are distributed widely throughout the Precambrian rocks of eastern and northern Canada, and the potential reserves of the mineral are very great. Development possibilities, however, in view of the comparatively low unit value of the mineral, hinge upon the two important factors of run-of-mine freedom from iron-bearing impurities and cost of transportation to grinding plant. As indicating present consumption trends, an official survey of the feldspar industry in the United States showed that sales by percentages of ground feldspar by merchant mills in 1938 were as follows: for manufacturing glass, 54.9; pottery, 34.5; enamel and sanitary ware 9.0; other ceramic uses 1.0 and soaps, abrasives, binders and various, 0.6 per cent.

Table 213.—Production of Feldspar in Canada, by Provinces, 1929-1938

	Quebec		Ontario		Manitoba		Average value per ton
	Tons	\$	Tons	\$	Tons	\$	
1929.....	15,790	133,492	21,737	206,979	.....	.....	\$ 9.07
1930.....	17,074	163,802	9,722	104,667	.....	.....	10.02
1931.....	10,381	86,842	7,962	100,119	.....	.....	10.19
1932.....	3,390	39,062	3,657	42,920	.....	.....	11.63
1933.....	6,183	59,283	4,387	45,350	88	484	9.86
1934.....	9,207	78,853	7,302	61,665	1,793	6,763	8.05
1935.....	7,002	63,075	8,656	75,003	2,084	6,252	8.13
1936.....	8,115	75,703	8,409	70,840	1,322	7,932	8.66
1937.....	12,285	105,612	9,061	72,610	.....	.....	8.35
1938.....	5,874	62,878	8,106	65,964	78	451	9.22

Values shown in Table 213 include the values of both crude and milled products.

Table 214.—Imports and Exports of Feldspar, 1934-1938

	Imports*		Exports	
	Tons	\$	Tons	\$
1934.....	1,039	15,245	10,532	65,158
1935.....	608	11,000	9,959	59,893
1936.....	741	14,240	†14,133	94,537
1937.....	1,794	25,134	†27,462	197,000
1938.....	657	10,450	†4,998	34,244
1938.....			(a) 6,455	44,531

† Includes both feldspar and nepheline syenite 1936 to March 31, 1938.

(a) Feldspar only from April 1, 1938. In addition from April 1, 1938 there were exported 22,787 tons of nepheline syenite valued at \$94,877 (all to U.S.A.)

* Crude and ground.

Table 215.—Feldspar Consumed in Specified Canadian Industries, 1937 and 1938

Industries	1937		1938	
	Tons	\$	Tons	\$
Abrasive products.....	53	1,506	41	1,129
Imported clay products.....	2,428	46,028	1,890	35,979
Soaps and cleaning preparations.....	1,119	13,329	1,008	11,212
Iron and steel products.....	441	7,385	390	5,215
Glass.....	3,074	52,501	1,343	20,788

Feldspar Prices (October, 1939)—UNITED STATES—Per ton, f.o.b. North Carolina, potash feldspar, 200 mesh, white, \$17 in bulk; soda feldspar, \$19. F.O.B. Maine, potash feldspar, white, 200 mesh, \$17, in bulk. Granular glass spar, white, 20 mesh, F.O.B. North Carolina, \$12.50 in bulk; semi-granular, \$11.75; soda feldspar, 200 mesh, white, \$19. Virginia: No. 1, 230 mesh \$18; 200 mesh, \$17; No. 17 glassmakers', \$11.75; No. 18, \$12.50. Enamelers, \$14 to \$16. Quotations on Spruce Pine, N.C., or Keene, N.H., basis. (Engineering and Mining Journal's "Metal and Mineral Markets"—New York).

"Canadian Chemistry and Process Industries", Toronto, published feldspar quotations September, 1939, as follows:—Feldspar, pottery, ground, 200 mesh, F.O.B. mill, carlots, ton—\$17; feldspar rock, F.O.B. mill, carlots, ton, \$5 to \$7.

Table 216.—World Production of Feldspar, 1937-1938

(Supplied by Imperial Institute)

(Long tons)

Producing Country	1937	1938	Producing Country	1937	1938
BRITISH EMPIRE			FOREIGN COUNTRIES—Con.		
United Kingdom—			Germany (Bavaria only).....	9,828	(a)
China stone.....	60,715	48,383	Italy.....	13,225	13,180
Canada (sales).....	19,059	12,552	Norway.....	23,859	(a)
India.....	487	691	Roumania.....	2,546	(a)
Australia (including china stone).....	3,806	2,370	Sweden.....	48,364	44,399
FOREIGN COUNTRIES			Egypt.....	156	196
Czecho-Slovakia (estimated).....	30,000	25,000	United States (sales).....	268,532	196,119
Finland (exports).....	3,181	4,966	Argentina.....	1,325	(a)
			Brazil.....	8,300	(a)
			Manchuria.....	(a)	(a)

Feldspar is also produced in U.S.S.R. and China.

(a) Information not available.

NEPHELINE-SYENITE

The following information relating to nepheline-syenite is abstracted from report No. 791 issued by the Bureau of Mines, Ottawa:—"Nepheline-syenite is an igneous rock consisting of a mixture of the feldspathoid mineral nepheline (or nephelite), a silicate of alumina and soda, and varying amounts of soda and potash feldspars. It is used in the ceramic trade (at present mainly in the glass industry) as a substitute for straight feldspar.

"Interest in the material as an industrial mineral or rock is of recent date, the first production being in 1936, when Canadian Nepheline Ltd., opened a quarry at Blue Mountain in Methuen Township, Peterborough county, about 27 miles northeast of Lakefield, and erected a mill at Lakefield to crush and process the rock for market."

Production of nepheline-syenite in Ontario during 1938 came from the Bancroft mine, Bancroft, Hastings county; Methuen township, Peterborough county and Gooderham, in Glanmorgan township.

The U.S. Bureau of Mines reported that three mills in the United States were processing nepheline-syenite in 1938 for use in glass manufacture. Two of them—the American Nepheline Corporation, Rochester, N.Y., a subsidiary of Canadian Nepheline, Ltd., and the New England Nepheline Co., Keene, N.H., affiliated with Golding-Keene Co.—were in operation in 1937. The Oxford Mining and Milling Co., West Paris, Maine, a subsidiary of the United Feldspar Corporation, began grinding Nepheline later. Crude rock for these mills is imported from Canada. It has been stated recently that, in wall tile and floor tile, the greater refractoriness of certain American clays is offset by additions of nepheline-syenite, owing to its active fluxing action and that nepheline permits the making of satisfactory floor-tile bodies at lower temperatures.

Table 217.—Production of Nepheline-Syenite in Canada,† 1936-1938

Year	Quantities	Value
		\$
1936 (b).....	(a)	37,426
1937.....	(a)	121,481
1938.....	(a)	142,737

† Produced in Ontario only.

(a) Quantity not published.

(b) First commercial production in Canada.

Nepheline-syenite used in Canada during 1938 in the manufacture of glass totalled 2,538 tons, valued at \$41,678.

Data relating to exports of nepheline-syenite prior to March 31, 1938 were combined with those of feldspar. Exports of nepheline-syenite April 1 to December 31, 1938 totalled 22,787 short tons valued at \$94,877.

QUARTZ (SILICA)

Output of primary silica products by the Canadian Quartz Mining industry includes crude and crushed dyke quartz, quartzite, sandstone and natural silica sands and gravels. The mineral in one or more of the forms thus defined was produced during 1938 in Nova Scotia, Quebec, Ontario and Saskatchewan. Shipments of silica in Nova Scotia were made to steel plants largely for the making of silica brick. In Quebec high grade silica sands were produced for the manufacture of glass and chemicals while a considerable tonnage of these same sands was sold for sand-blasting and various other purposes; in the same province relatively large quantities of crushed quartzite or sandstone were mined and milled for the manufacture of silicon carbide and other products. The greater part of the tonnage of silica shipped in Ontario during 1938 represented material intended for use in the production of silica brick and ferro-silicon and for the fluxing of nickel-copper ores. Quartz production as recorded for Saskatchewan represented natural silica sands or gravels shipped as flux to the Flin Flon Smelter of the Hudson Bay Mining and Smelting Co. Ltd.

The price per ton of the several grades of silica varies greatly depending on its purity and on the purpose for which it is to be used. Silica, on the whole, is a comparatively low-priced commodity, and therefore the location of a deposit with respect to markets is of great importance. According to a report issued by the Bureau of Mines, Ottawa, the larger markets for silica are in the provinces of Quebec and Ontario, and any new deposits being opened up should be within economic reach of either Montreal or Toronto.

Table 218.—Production in Canada and Imports of Quartz and Silica Products, 1937 and 1938.

	1937		1938	
	Short tons	Value	Short tons	Value
		\$		\$
PRODUCTION (*) (SHIPMENTS)—				
Nova Scotia.....	11,732	14,078	4,701	8,415
Quebec.....	127,535	448,327	85,153	315,251
Ontario.....	1,142,372	633,073	1,173,259	597,037
Manitoba.....				
Saskatchewan.....	95,809	33,533	116,898	40,914
British Columbia.....				
Canada.....	1,377,448	1,129,011	1,380,011	961,617
IMPORTS—				
Ganister.....	2,405	5,980	360	2,888
Flint and ground flint stones.....	1,811	38,616	1,005	16,946
Silex or crystallized quartz, ground or unground.....	4,276	103,940	3,069	77,815
Silica sand for glass, carborundum and steel and filtration plants and sand blasting (a).....	212,840	373,760	172,073	338,832
Silica fire brick, 90%† silica.....		539,253		240,184

(*) Includes both crude and crushed quartz and quartzite, silica flux and natural silica sands. See footnote to Table 219.
(a) 164,601 tons from the United States and 7,427 tons from Belgium in 1938 and 212,386 tons from the United States, 222 tons from Belgium and 232 tons from the United Kingdom in 1937.

(†) Entirely from United States.

Table 219.—Consumption of Natural Low Grade Silica Sand and Silica Gravel as Non-ferrous Smelter Flux, 1937 and 1938

	1937		1938	
	Tons	\$	Tons	\$
Ontario.....	980,427	343,149	990,020	349,657
Saskatchewan.....	95,809	33,533	116,898	40,914
Canada Total.....	1,076,236	376,682	1,106,918	390,571

(*) Included in totals shown in Tables 218 and 220; also complete data for production of this material in Ontario during previous years are not available.

Table 220.—Production of Quartz (Silica) in Canada, 1929-1938

Year	Ton	\$	Year	Ton	\$
1929.....	265,949	561,527	1934.....	272,563	482,265
1930.....	226,200	418,127	1935.....	233,002	424,882
1931.....	195,724	303,158	1936*	1,046,649	597,718
1932.....	189,132	276,147	1937*	1,377,448	1,129,011
1933.....	185,783	297,820	1938*	1,380,011	961,671

In 1916 the annual statistics of quartz production included a small output of grinding pebbles obtained from near Jackfish, Ontario, on the north shore of Lake Superior, by the Canada Pebble Co., Ltd. These pebbles were used chiefly in the cement industry. It was also reported that considerable deposits of rounded quartzite pebbles, suitable for grinding purposes, were found on the Cypress Hills, south of Maple Creek, Southern Saskatchewan. During 1920 the production of grinding pebbles from the Jackfish deposits amounted to 560 tons; in 1925 the total was 105 tons and in 1926 only 64 tons. The Hedley Gold Mining Co. used pebbles obtained from Hedley, Similkameen district, British Columbia, in 1922. No production of grinding pebbles has been reported in Canada during recent years.

Prices—UNITED STATES (October, 1939).—Silica, per ton, water ground and floated, in bags, f.o.b. Illinois: 325 mesh, \$21 to \$40 for 92 to 99½ per cent grades. Dry ground, air floated, 325 mesh, 92 to 99½ per cent silica, \$20 to \$30. Glass sand, f.o.b. producing plant, \$1.25 to \$5 per ton; molding sand, 50 cents to \$3.50; blast sand, \$1.75 to \$6. California: \$5 for quartz and \$2.50 for sand. Quartz rock crystals for fusing, all sizes, \$100 per ton; prisms for piezo-electrical and optical use command premium. (Engineering and Mining Journal's "Metal and Mineral Markets"—New York).

"Canadian Chemistry and Process Industries"—Toronto—quotations (September, 1939)—silica sand, various grades, carlots, ton \$8 to \$9. Silica quartz 99 per cent, 110-220 grade, carlots—to \$15 per ton. The price for the lower grades of crude quartz varies greatly according to purity and purpose of use.

Table 221.—Consumption of Quartz, Silica Sand, Etc., in Canada, by Industries, According to Census of Industry Reports, 1937 and 1938

Industry	1937		1938	
	Quantity	Cost at works	Quantity	Cost at works
	Short tons	\$	Short tons	\$
SILICA SAND AND SILICA (including ground quartz)—				
Soaps and cleaning preparations.....	4,685	76,378	4,987	80,056
Acids and salts.....	11,659	54,769	11,453	49,391
Paints.....	836	21,306	838	23,986
Refractories.....	35	256	6	60
Roofing paper.....	1,976	11,657	1,050	5,132
Abrasives.....	45,240	211,899	32,746	159,284
Glass.....	82,267	382,728	77,499	363,233
Enameling materials.....	493	3,971	380	5,700
Products from imported clays.....	3,032	44,648	2,576	38,441
Foundry facings and supplies.....	48	430	32	243
Non-ferrous smelters†.....	1,076,236	376,682	1,106,918	390,571
Steel foundries.....	37,015	207,510	36,123	194,426
Total accounted for.....	1,263,532	1,392,234	1,274,608	1,310,523
QUARTZ AND QUARTZITE—				
Acids and salts.....	1,537	3,632	1,421	3,201
Ferro-alloys.....	35,633	80,201	23,711	47,539
Total accounted for.....	37,170	83,833	25,132	50,740

NOTE.—Consumption values are costs at works.

† The quantities reported under this industry represent low grade natural silicious sands used for fluxing purposes. In addition to the quantities shown for 1938 a relatively large quantity of quartz and quartzite is consumed in the manufacture of silica brick.

Table 222.—Principal Statistics of the Feldspar and Quartz Mining Industry, 1937 and 1938

	ONTARIO (x) (b)		QUEBEC	
	1938	1937	1938	1937
Number of firms (a).....	15	18	17	21
Capital employed..... \$	585,102	485,663	1,020,034	867,329
Number of employees—On salary.....	25	25	24	25
On wages.....	142	160	184	235
Total.....	167	185	208	260
Salaries and wages—Salaries..... \$	30,133	30,697	35,675	38,163
Wages..... \$	140,959	161,297	135,481	164,541
Total..... \$	171,092	181,994	171,156	202,704
Selling value of products (gross)..... \$	855,518	874,775	378,129	553,939
Cost of fuel and purchased electricity..... \$	30,360	29,092	45,290	53,519
Cost of process supplies..... \$	68,774	75,130	24,085	28,729
Net value of sales..... \$	756,384	770,553	308,754	471,691

(x) In 1938 includes 1 firm operating in Nova Scotia, Manitoba and Saskatchewan (a total of 3). In 1937 includes 1 firm in Nova Scotia and 1 in Saskatchewan.

(a) Small shippers from whom reports were unobtainable and whose production is recorded from consumers' returns are sometimes not included in the total.

(b) Includes data relating to production of nepheline-syenite.

Table 223.—Capital Employed in the Feldspar and Quartz Mining Industry, in Canada, 1938

	Quebec†	Ontario
	\$	\$
CAPITAL EMPLOYED AS REPRESENTED BY—		
(a) Present cash value of the land (excluding minerals).....	137,572	77,484
(b) Present value of buildings, fixtures, machinery, tools and other equipment.....	682,499	378,200
(c) Inventory value of materials on hand, ore in process, fuel and miscellaneous supplies on hand.....	35,399	27,564
(d) Inventory value of finished products on hand.....	25,807	72,090
(e) Operating capital (cash, bills and accounts receivable, prepaid expenses, etc.).....	141,757	26,764
Total.....	1,023,034	582,102

† Includes 1 firm in Nova Scotia.

Table 224.—Number of Wage-earners in the Feldspar and Quartz Mining Industry on Pay Roll, by Months, 1937 and 1938

Month	1937	1938		
		Quebec (a)	Ontario	Canada
January.....	278	202	77	279
February.....	282	192	100	292
March.....	289	180	100	280
April.....	338	159	112	271
May.....	345	195	167	362
June.....	416	217	165	382
July.....	461	229	184	413
August.....	455	254	175	429
September.....	490	204	164	368
October.....	484	156	162	318
November.....	474	157	142	299
December.....	367	134	88	222

(a) June-September includes wage-earners in Nova Scotia.

THE GYPSUM INDUSTRY**(1) Primary Production—The Gypsum Mining and Quarrying Industry**

Increases in output of gypsum over 1937 were realized by the industry in New Brunswick, Ontario, Manitoba and British Columbia and the decrease in the total Canadian production of gypsum in 1938 resulted from a decline in the total of shipments from properties in Nova Scotia where production in 1938 amounted to 870,856 tons worth \$908,383 compared with 926,796 tons at \$978,288 in 1937. The gypsum production of Nova Scotia in 1938 represented 86 per cent of the entire Canadian output as compared with 88.5 per cent in 1937. The total production of gypsum in Canada from 1874 to 1938, inclusive, totalled 26,831,469 tons valued at \$58,170,370.

The average sales value per ton of lump gypsum, including anhydrite was \$1.20 in 1938 compared with \$1.30 in 1937; crushed \$1.05 against \$1.07 in 1937; fine ground \$5.26 against \$6.24 in 1937 and calcined grades \$5.44 compared with \$5.45 in 1937.

In 1938 the number of firms reporting production was 9 and the gypsum quarries and mines in operation totalled 15. Some of the Canadian gypsum mining companies confine their operations in the Dominion to the production and shipment of crude gypsum or anhydrite, while others, in addition to marketing various grades of crude gypsum, produce a calcine for sale or for consumption in their own gypsum products plants.

According to the Bureau of Mines, Ottawa, the materials produced by the Canadian gypsum mining industry are the hydrous calcium sulphate, commonly known as gypsum, the partly dehydrated material known as plaster of Paris or wall plaster, and the anhydrous calcium sulphate known as anhydrite. The calcined material enters into the manufacture of wall-board, gypsum blocks, insulating material, acoustic plaster, etc. Anhydrite is used mainly as a fertilizer for the peanut crop in the Atlantic Seaboard states of the southern United States.

The use of anhydrite in England for the manufacture of sulphuric acid, ammonia sulphate and special plasters is increasing and a shipment of the mineral to England in 1937 marked the entry of Canada into this market.

The Minerals Year Book (1939) of the United States Bureau of Mines contains the following information relating to the gypsum industry in the United States: "Of outstanding interest in 1938 was the continued climb in sales of gypsum lath to a new high record . . . More active development of markets in the Southeastern States is indicated by the erection of processing mills by two gypsum companies. These mills, one in Georgia and one in Florida, began production of a complete line of gypsum products in the early part of 1939. They use crude gypsum imported from Canada . . . Fresh interest was aroused in the drying and grinding of crude gypsum as a single operation when a hammer-type mill designed for this purpose was installed in one of the new processing plants under construction in the southeast. It is understood that at least one producing company is experimenting with the drying, grinding, and calcining of gypsum as a single operation in a hammer-type mill."

"Mineral Trade Notes" (May 20, 1939) of the United States Dept. of the Interior refers to the use of gypsum in Germany as follows: "There has been a shortage of sulphuric acid in Germany for several years and it has been difficult to secure adequate supplies of foreign iron pyrites because of adverse foreign exchange. In 1937 production could not keep pace with requirements of the superphosphate and nitrogen fertilizers, and for stretching the supplies of sulphuric acid, Germany resorted again to the substitution of gypsum for producing ammonium sulphate". Imports of gypsum and phosphatic gypsum into Germany in 1937 totalled 16,577 long tons compared with 28,106 long tons in 1936.

Table 225.—Production in Canada, Imports and Exports of Gypsum, 1937 and 1938

	1937		1938	
	Quantity	Value	Quantity	Value
	Tons	\$	Tons	\$
SHIPMENTS BY GRADES—				
Grade (1)—Lump or mine run.....	51,147	66,237	17,030	20,391
Crushed.....	902,217	961,776	892,028	939,073
Fine ground.....	916	5,716	473	2,489
Calcined gypsum (2).....	92,907	506,754	99,268	540,312
Total.....	1,047,187	1,540,483	1,008,799	1,502,265
SHIPMENTS BY PROVINCES—				
Nova Scotia.....	926,796	978,288	870,856	908,383
New Brunswick.....	36,906	131,727	48,418	159,203
Ontario.....	53,780	233,895	57,503	242,470
Manitoba.....	13,941	88,095	14,571	82,129
British Columbia.....	15,764	108,478	17,451	100,080
Total.....	1,047,187	1,540,483	1,008,799	1,502,265
Total gypsum mined and quarried (1).....	1,151,064		1,084,057	
Total gypsum calcined (2).....	119,677		122,710	
IMPORTS—				
Gypsum, crude (sulphate of lime).....	56	610	8	212
Gypsum, ground, not calcined.....	333	11,940	418	13,602
Plaster of Paris or gypsum, calcined, and prepared wall plaster.....	1,380	28,092	1,326	25,464
Total.....	1,769	40,642	1,752	39,278
EXPORTS—				
Gypsum or plaster, crude.....	(a) 841,191	960,711	(b) 810,109	932,742
Plaster of Paris, ground, and prepared wall plaster.....	1,234	29,552	1,458	34,004
Total.....	842,425	990,263	811,567	966,746

(1) Includes some anhydrite quarried in Nova Scotia.

(2) Does not include gypsum calcined in manufacturing plants located in Montreal and Calgary.

(a) 735,125 tons at \$851,518 to United States and 103,602 tons at \$106,443 to United Kingdom.

(b) 675,734 tons valued at \$793,196 to United States and 134,375 tons at \$139,546 to United Kingdom.

Table 226.—Production (Sales) of Crude and Calcined Gypsum in Canada, 1929-1938

Year	Tons	Value \$
1929.....	1,211,689	3,345,696
1930.....	1,070,968	2,818,788
1931.....	863,752	2,111,517
1932.....	438,629	1,080,379
1933.....	382,736	675,822
1934.....	461,237	863,776
1935.....	541,864	932,203
1936.....	833,822	1,278,971
1937.....	1,047,187	1,540,483
1938.....	1,008,799	1,502,265

Table 227.—Annual Production of Gypsum in Canada, by Provinces, 1934-1938

Year	Nova Scotia		New Brunswick		Ontario		Manitoba		British Columbia		Canada	
	Quantity	Value	Quantity	Value	Quantity	Value	Quantity	Value	Quantity	Value	Quantity	Value†
	Tons	\$	Tons	\$	Tons	\$	Tons	\$	Tons	\$	Tons	\$
1934....	378,287	488,044	30,398	104,709	33,234	141,389	9,657	81,553	9,661	48,081	461,237	863,776
1935....	454,703	523,216	30,796	105,960	38,247	164,807	10,500	85,885	7,618	52,335	541,864	932,203
1936....	729,019	808,294	38,470	123,560	40,191	182,783	12,064	87,076	14,078	77,258	833,822	1,278,971
1937....	926,796	978,288	36,906	131,727	53,780	233,895	13,941	88,095	15,764	108,478	1,047,187	1,540,483
1938....	870,856	908,383	48,418	159,203	57,503	242,470	14,571	92,129	17,451	100,080	1,008,799	1,502,265

† Gross.

Table 228.—Consumption of Gypsum in Canadian Cement Industry, 1930-1938

Year		Tons	Year		Tons
1930.....		74,227	1935.....		21,611
1931.....		56,677	1936.....		25,447
1932.....		27,537	1937.....		33,691
1933.....		13,319	1938.....		51,975
1934.....		19,172			

Table 229.—Principal Statistics of the Gypsum Mining Industry in Canada, 1937 and 1938

		Nova Scotia	New Brunswick, Ontario, Manitoba, British Columbia	Total Canada
Number of firms.....		5	(*) 4	8
1938.....		5	(*) 5	9
Capital employed.....		\$ 4,178,656	2,723,566	6,902,222
1938.....		\$ 4,395,198	2,930,214	7,325,412
Number of employees—				
On salary—				
1937.....		25	36	61
1938.....		28	32	60
On wages—				
1937.....		312	229	541
1938.....		324	239	563
Salaries and wages—				
Salaries—				
1937.....		\$ 44,903	65,469	110,372
1938.....		\$ 48,398	55,068	103,466
Wages—				
1937.....		\$ 267,875	217,149	485,024
1938.....		\$ 251,516	173,045	424,561
Fuel and electricity—				
Cost—				
1937.....		\$ 67,743	88,372	156,115
1938.....		\$ 63,102	86,047	149,149
Value of process supplies used—				
1937.....		\$ 67,167	39,795	106,962
1938.....		\$ 58,443	31,714	90,157
Selling value of products (gross)—				
1937.....		\$ 978,288	562,195	1,540,483
1938.....		\$ 908,383	593,882	1,502,265

(*) Includes 1 company also operating in Nova Scotia.

Table 230.—Capital Employed in the Gypsum Industry in Canada, by Provinces, 1938

	Nova Scotia	New Brunswick, Ontario, Manitoba and British Columbia	Canada
	\$	\$	\$
Capital employed as represented by—			
Present cash value of the land (excluding minerals).....	2,074,356	380,253	2,454,609
Present value of buildings, fixtures, machinery, tools and other equipment.....	888,275	1,528,938	2,417,213
Inventory value of materials on hand, ore in process, fuel and miscellaneous supplies on hand.....	264,821	124,589	389,410
Inventory value of finished products on hand.....	77,823	59,715	137,538
Operating capital (cash, bills and accounts receivable, prepaid expenses, etc.)....	1,089,923	836,719	1,926,642
Total.....	4,395,198	2,930,214	7,325,412

Table 231.—Number of Wage-earners on Payroll or Time Record on the 15th of Each Month or Nearest Representative Date, 1937 and 1938

Month	1937		1938		
	Mine	Mill	Mine		Mill
			Surface	Under-ground*	
January.....	118	156	20	71	134
February.....	108	135	26	66	160
March.....	117	208	48	72	218
April.....	317	197	199	78	181
May.....	396	230	303	85	220
June.....	423	281	329	94	215
July.....	468	239	371	101	235
August.....	469	230	347	102	243
September.....	477	233	355	100	264
October.....	488	227	338	97	222
November.....	379	216	288	80	244
December.....	239	160	229	79	205

* Underground work confined to New Brunswick, Ontario and Manitoba.

(2) The Gypsum Products Industry

Nine plants owned and operated by four companies manufactured gypsum products in Canada during 1938 and their output was valued at \$2,715,894 compared with \$2,525,507 in 1937 and \$1,970,822 in 1936. Gypsum wallboard and hardwall plasters were the chief products with other lines of lesser dollar value being rockwool, gypsum tile, gypsum blocks, stucco, etc.

Capital investment in the manufacturing end of the gypsum industry during 1938 amounted to \$2,823,184 and employment was afforded to 245 people who received \$289,583 in salaries and wages. Expenditures for fuel and electricity were reported at \$118,936 and materials used in manufacturing processes cost \$1,123,950.

Table 232.—Materials Used in the Gypsum Products Industry, 1937 and 1938

Material	Unit of measure	1937		1938	
		Quantity	Cost at works	Quantity	Cost at works
			\$		\$
Gypsum, crude.....	short ton	18,568	79,122	18,528	69,598
Gypsum, calcined (plaster of Paris).....	short ton	82,811	436,723	99,441	505,693
Paper.....	short ton	5,001	245,330	5,143	253,175
Starch or paste.....	short ton	188	31,070	186	29,217
Hair.....	short ton	96	20,339	110	19,641
Retarder.....	short ton	182	13,295	367	15,772
Sawdust or shavings.....	short ton	211	2,441	369	2,927
Containers, etc.....	xxx		92,606		98,989
All other materials.....	xxx		81,642		128,938
Total.....	xxx		1,002,568		1,123,950

Table 233.—Output of the Gypsum Products Industry, 1937 and 1938

Products	Unit of measure	1937		1938	
		Quantity	Selling value at works	Quantity	Selling value at works
			\$		\$
Gypsum wallboard.....	sq. ft.	53,319,517	1,372,476	61,860,550	1,451,853
Gypsum hard wall plasters.....	short ton	63,786	877,840	66,780	920,597
All other products (*).....	xxx		275,191		343,444
Total.....	xxx		2,525,507		2,715,894

(*) Includes gypsum tile, gypsum blocks, rockwool, etc.

Table 234.—World Production of Gypsum, 1937 and 1938

(Supplied by Imperial Institute)

(Long tons)

Producing Country	1937	1938	Producing Country	1937	1938
BRITISH EMPIRE			FOREIGN COUNTRIES—Con.		
United Kingdom.....	1,094,109	1,092,395	Luxemburg.....	19,411	19,587
Eire.....	11,463	13,153	Portugal.....	11,210	8,893
Union of South Africa.....	36,582	38,490	Roumania (b).....	69,515	(a)
Canada.....	1,027,736	900,713	Sweden.....	106	(a)
Cyprus (estimated).....	15,000	12,000	Yugoslavia (estimated).....	10,000	10,000
Palestine.....	3,872	3,921	Algeria.....	39,462	32,799
India.....	46,090	69,823	Egypt (b).....	249,634	208,738
Australia.....	155,209	173,400	Morocco (Spanish) (exports).....	924	1,147
FOREIGN COUNTRIES			Tunis (estimated).....	22,400	(a)
Austria.....	48,000	(a)	Mexico.....	(c) 70,000	(c) 70,000
Estonia.....	12,547	13,695	United States.....	2,730,505	2,396,612
France.....	1,300,000	(a)	Argentina.....	67,143	(a)
Germany.....	1,657,000	(a)	Brazil (estimated).....	2,000	2,000
Greece.....	17,641	(a)	Chile.....	21,500	(a)
Italy (including alabaster).....	409,625	419,359	Peru.....	12,691	(a)
Latvia (exports).....	193,802	193,853	China (estimated).....	70,000	70,000
			New Caledonia.....	364	1,053

Gypsum is also produced in Poland, Spain, Switzerland, U.S.S.R., French Morocco, Cuba, Japan and Korea.

(a) Information not available.

(b) Converted from cubic metres at the rate of 1 cubic metre=2 long tons. Includes alabaster.

(c) Estimated.

IRON OXIDES (OCHRE) MINING INDUSTRY

For many years there has been an annual production in the Province of Quebec of iron oxide from deposits situated between Champlain and Three Rivers; in 1938 shipments were made in Quebec from properties operated at Pointe du Lac, St. Maurice county, Red Mill and St. Adelphe, in Champlain county, also from Alnaville in the Lake St. John district and from Lacoste, Marchand township, Labelle county.

The Bureau of Mines, Ottawa, reports that the present producing localities have met the requirements of the domestic pigment trade for cheaper grades for many years past. Other prospective deposit could, if necessary be drawn upon in Quebec and Ontario; deposits of ochre also occur in Nova Scotia, Manitoba, Saskatchewan, Alberta and British Columbia.

The larger part of the tonnage recorded as annual production of iron oxides in Canada represents crude material for use in the purification of heating and illuminating gas, whereas the calcined or higher grades, are produced for use in the manufacture of paints and pigments.

Imports into Canada of ochres, ochrey earths, siennas and umbers during 1938 totalled 2,333,112 pounds valued at \$37,631 of which 1,583,753 pounds valued at \$23,836 came from the United States; 340,369 pounds at \$4,119 from France; 287,948 pounds at \$6,584 from the United Kingdom, and 70,843 pounds worth \$1,794 from Italy. Canadian exports of mineral pigments, iron oxides, ochres, etc., in 1938 totalled 3,370,300 pounds valued at \$104,814, of which 1,567,100 pounds at \$34,694 went to the United States and 800,100 pounds at \$28,725 to the United Kingdom.

In 1938, there were six Canadian firms reporting commercial mine shipments of iron oxides, five in Quebec and one in British Columbia; capital employed by the industry totalled \$200,057: \$31,557 were distributed as salaries and wages to 37 employees and the cost of fuel, purchased electricity, and process supplies consumed amounted to \$8,124.

Table 235.—Production in Canada, Imports and Exports of Iron Oxides, 1937 and 1938

	1937		1938	
	Quantity	Value	Quantity	Value
	Tons	\$	Tons	\$
PRODUCTION (SALES) (*)—				
Quebec.....	5,617	77,640	5,387	67,209
British Columbia.....	580	6,000	434	4,560
Total.....	6,197	83,640	5,821	71,769
IMPORTS—				
Ochres, ochrey earths, siennas and umbers.....	1,623	56,084	†1,166	37,631
Oxides, fireproofs, rough stuff, fillers and colours, dry, n.o.p.....	4,042	844,149	3,038	718,329
EXPORTS—				
Mineral pigments, iron oxides, ochres, etc.....	1,755	105,240	1,685	104,814

(*) Includes both crude and refined.

(†) 792 tons from United States.

Table 236.—Production of Iron Oxides in Canada, 1929-1938

Year	Quantity	Value
	Short tons	\$
1929.....	6,518	115,932
1930.....	6,596	83,873
1931.....	5,520	49,205
1932.....	5,240	46,161
1933.....	4,357	53,450
1934.....	4,959	66,166
1935.....	5,516	77,075
1936.....	5,854	69,630
1937.....	6,197	83,640
1938.....	5,821	71,769

The production of iron oxides in Canada since the first recording of statistics in 1886 to the end of 1938 totalled 281,370 short tons valued at \$2,779,546.

Table 237.—Consumption of Iron Oxides in Specified Canadian Industries, 1932-1938

Years	Coke and Gas		Paints, pigments and varnishes		Paints, pigments and varnishes	
	Quantity	Value	Quantity	Value	Quantity	Value
	Tons (a)	\$	Tons (b)	\$	Tons (c)	\$
1932.....	3,736	35,284	701	52,323	512	48,047
1933.....	2,734	29,076	504	43,826	491	43,671
1934.....	3,757	47,010	580	53,539	544	53,236
1935.....	3,701	46,204	990	77,758	564	56,219
1936.....	(d)	41,291	733	67,850	634	65,819
1937.....	(d)	40,414	890	81,709	566	49,082
1938.....	(d)	41,013	822	70,736	487	41,062

(a) Oxide and purifying materials.

(b) Iron oxide pigments.

(c) Ochres, siennas and umbers.

(d) Data not available.

NOTE.—A classification of iron oxide colours is contained in the Bureau of Statistics annual Mineral Production report for 1936.

Table 237.—Consumption of Iron Oxides in Specified Canadian Industries, 1932-1938
—Concluded

Prices.—CANADIAN—September, 1939*

Iron Oxides—Red.....	2 cents to 7 cents per pound.
Yellow.....	5 cents to 7 cents per pound.
Brown.....	5 cents to 8 cents per pound.
Black.....	5 cents to 7½ cents per pound.
Ochres.....	2 cents to 4 cents per pound.
Siennas.....	5 cents to 7½ cents per pound.
Umbers.....	4½ cents to 5 cents per pound.

(*) Canadian Chemistry and Metallurgy, Toronto.

Prices—UNITED STATES—October, 1939.

Iron Oxide per pound: standard (No. 1 quality) Spanish red, 3 to 4 cents nominal; domestic earth 2½ to 3 cents.

Ochre per ton, f.o.b. Georgia mines; \$19 in sacks; \$22.50 in barrels. Buff clay, 98 per cent through 325 mesh, \$19. F.O.B. Virginia, dark yellow, 300 mesh, 60 per cent ferric oxide, in jute bags, \$19.50..

(†) Engineering and Mining Journal—Metal and Mineral Markets—New York.

Table 238.—Principal Statistics of the Natural Iron Oxides Industry in Canada, 1937 and 1938

	1937	1938
Number of firms.....	(b) 6	(c) 6
Capital employed.....	\$ 213,248	200,057
Number of employees—On salaries.....	6	(d) 5
On wages.....	44	32
Total.....	50	37
Salaries and wages—Salaries.....	\$ 8,770	7,900
Wages.....	26,598	23,657
Total.....	\$ 35,368	31,557
Selling value of products (gross).....	\$ 83,640	71,769
Cost of fuel and purchased electricity.....	13,368	7,931
Cost of process supplies.....	510	193
Selling value of products (net).....	\$ 69,762	63,645

(a) Four (4) producing.

(b) Five (5) producing.

(c) Five (5) producing in Quebec and one (1) in B.C.

(d) One (1) female.

Table 239.—Capital Employed in the Iron Oxides Industry in Canada, 1938

	\$
CAPITAL EMPLOYED AS REPRESENTED BY—	
Present cash value of the land (excluding minerals).....	50,776
Present value of buildings, fixtures, machinery, tools and other equipment.....	90,995
Inventory value of materials on hand, ore in process, fuel and miscellaneous supplies on hand.....	31,366
Inventory value of finished products on hand.....	24,720
Operating capital (cash, bills and accounts receivable, prepaid expenses, etc.).....	2,200
Total.....	200,057

Table 240.—Wage-earners Employed, by Months, 1937 and 1938

Months	Number		Months	Number		
	1937	1938		1937	1938	
		Mine Mill			Mine	Mill
January.....	22	21	July.....	63	30	17
February.....	22	18	August.....	61	28	18
March.....	36	18	September.....	45	22	17
April.....	32	13	October.....	46	14	20
May.....	57	17	November.....	45	5	18
June.....	64	16	December.....	40		

THE MICA MINING INDUSTRY

In 1938 phlogopite mica was shipped from properties chiefly located in the Hull-Buckingham district of Quebec and in Eastern Ontario from deposits occurring in the Kingston-Perth area. According to a report prepared by Mr. H. S. Spence of the Bureau of Mines, Ottawa, the production of sheet mica in Canada is almost wholly of the phlogopite or amber mica variety. It is derived almost entirely from adjacent sections of Ontario and Quebec, within an area extending roughly from Kingston, Ontario northeastward into Hull and Papineau counties, Quebec; a few scattered amber mica occurrences are also known in the Province of Quebec as far east as Quebec City, but very little mining has been conducted on them.

Production of muscovite, or white mica, in Canada has been negligible, small amounts have been recovered occasionally as a by-product from feldspar mining in general, the proportion of sound, merchantable sheet mica in Canadian pegmatites has proved too low for profitable mining for this mineral alone. In 1937 a small production of this class of mica came from a deposit in Ryerson township near Burk's Falls, Ontario, while in Quebec during 1938 a small quantity was produced at Lac Duclair, Bergeronnes township, Saguenay county and development work conducted on a deposit in Lacoste township, Charlevoix county.

A deposit of fine flake muscovite or sericite schist occurs at Baker Inlet, near Prince Rupert, British Columbia and in 1938 shipments of this material were made to Vancouver where it was prepared for the market by gardening.

Sheet mica is marketed in various classes, depending on the amount of preparation the mine-run material receives. Formerly, much of the Canadian output was sold in the semi-rough form, termed "Thumb trimmed", but owing to stricter trade requirements this practice has now been largely supplanted by knife trimming, which provides a much higher grade of product. Scrap mica, representing the waste from mining or trimming, is sold to grinding mills or the production of mica powder, used extensively in the roofing and rubber trades.

Plants now exist in Canada for the expanding by heat processing of the hydrated variety of mica known as vermiculite. This mineral expands tremendously when heated, yielding an exceedingly light-weight product, which is finding wide application for heat and sound insulation. In 1938, it was reported that all Canadian plants drew their supply of crude vermiculite from a deposit at Libby, Montana. No occurrences of this class of mica are known in Canada, though there have been unconfirmed reports of discoveries in British Columbia.

The Department of Mines of the Union of South Africa reported that a production of vermiculite on a small scale began in 1938. Enquiries from England for this mineral stimulated interest generally, but particularly in the deposits near Palabora in the Leydsdorp district.

Total exports of mica from Canada in 1938 were valued at \$89,259 compared with \$171,770 in 1937; the value of mica imported into the Dominion, exclusive of mica schist, was \$86,803 in 1938 as against \$83,596 in the year immediately preceding.

The number of mica mining firms reported as active in 1938 totalled 40 of which 31 were located in the Province of Quebec, 8 in Ontario and 1 in British Columbia. Capital employed by the industry amounted to \$159,758; employees numbered 156 and salaries and wages paid aggregated \$74,424. The cost of fuel, purchased electricity, and process supplies used was recorded at \$19,247 and the net value of sales was estimated at \$61,742.

In September 1939 a United States Bureau of Mines report refers to the strategic uses of mica as follows: "Military authorities list mica as a strategic material. Domestic mines in North Carolina, New Hampshire, Connecticut, and South Dakota may be depended upon to supply a great deal more mica than they do now, but probably never enough for our needs. . . particularly of certain kinds. One of the largest uses for sheet mica (excluding splittings) is for radio tube bridges and supports. Most of the mica so used is small, being punched from irregular sheets less than two square inches in area; only one-third of this mica emerges as stamped products, and the remaining two-thirds as cuttings, which cannot be used for any purpose except the manufacture of ground mica used chiefly for coating roofing material to prevent sticking in the roll.

"The electrical appliance field takes a somewhat larger ranges of sizes. Electric mica, so-called, is chiefly the quality known as black-stained, which is somewhat less expensive than the good-stained material used in radio tubes. Probably 75 per cent of the mica used in household appliances is of domestic origin, and we could become self-sufficient in respect to this material if need arose—partly by increasing production and partly by eliminating non-military uses such as household cooking appliances. In respect to radio mica, savings also could be made, particularly in household sets, although such savings might be offset to some extent by the expansion of necessary communications.

"There are other fields, however, wherein the United States Bureau of Mines anticipates that war emergency would increase our requirements in mica, and unfortunately, it is these uses that require the highest qualities of mica, which we definitely cannot produce in anything like sufficient amount in the United States. From a military standpoint, supplies of mica for making condensers and spark plugs are especially important. Practically all mica used for all types of mica condensers is imported, principally from India. Mica for use in all kinds of condensers must not only be a good insulator and possess high dielectric strength, or break-down resistance but also must have a low-power factor. Of the 170,000 pounds or more of rough block mica used in 1937 for the manufacture of condensers, about 130,000 pounds was fair-stained or better, and 40,000 pounds was good-stained quality. . . . very little mica of condenser quality can be obtained for less than \$1.25 a pound, and material for some purposes costs upwards of \$5 a pound.

"Ordinary spark plugs such as are used in automobiles are unsafe in airplane work or for other services where their cores might be cracked by the splash of oil or rapid changes in temperature. In a typical mica spark plug, the centre wire or electrode is insulated by a wrapping of thin sheet mica known as a 'cigarette', outside of which mica washers are fitted and pressed tightly together. The washers that go inside of the engine cylinder, exposed to the full heat of the explosion, are generally made of phlogopite or amber mica, which has to be imported from Canada or Madagascar. Those in the cooler part of the plug, however, are muscovite and can be made from sizes small enough so that their procurement affords no serious supply problem, even in war time. The four manufacturers of spark plugs in 1937 reported to the United States Bureau of Mines a consumption of 12,580 pounds of fair-stained mica of cigarette quality and 9,725 pounds of amber mica for nose washers. Unless ceramic or other types of spark plug cores can be further perfected, however, war-time needs would be much greater. To make a thousand spark plugs, at least 11 pounds of high-grade mica are needed for cigarettes, the Bureau of Mines finds, and this figure must be increased to 16 pounds or more to cover the need for similar quality mica for shielded sleeve linings on such proportion of the plugs as are made with this added feature. In terms of rough block mica, the figure may be as high as 45 pounds, including waste. Cut mica for spark plug cigarettes is worth at least \$2.50 a pound and some manufacturers pay \$7 a pound. For nose washers the consumption of phlogopite is of the order of 20 to 25 pounds per thousand plugs. The best estimate of our war-time needs is 25,000 to 50,000 pounds of cigarette mica, worth on the average at least \$3 a pound, and a similar quantity of small amber mica for making spark plug washers and valued at, say 70 cents a pound which probably can be had from Canada if Madagascar supplies were cut off. For top washers, around 20,000 pounds of muscovite are needed, but this offers no serious procurement problem as it can be obtained domestically or from South America.

"We are virtually dependent upon British India for our high-grade condenser and spark plug cigarette mica. It would seem quite impossible to attempt to cover any large proportion of our needs of such mica from domestic or other foreign mines. Even in British India not more than 10 per cent of the sheet mica mined comes up to the rigid requirement of such material. Moreover, in India, the opportunity for selection is far greater than it would be under American conditions, because in that country the mica is given far more careful inspection in the mines. Skilled labour is cheap, and the small books of mica are repeatedly handled and examined during the laborious process of sorting and manufacturing mica films and splittings. In the splitting operation, as leaf after leaf is removed, stained or spotted laminae are laid bare and can be eliminated and sold separately. In the United States only about one-fifth as much sheet mica is mined as in India, no splitting is done, and even the trimming is far less complete because more irregular pieces can be marketed."

Table 241.—Production of Mica in Canada, by Provinces, 1929-1938

Year	Quebec		Ontario		Canada	
	Quantity	Value	Quantity	Value	Quantity	Value
	Tons	\$	Tons	\$	Tons	\$
1929.....	1,062	72,630	2,991	45,919	4,053	118,549
1930.....	430	61,729	740	34,275	1,170	96,004
1931.....	290	30,601	1,049	23,465	1,339	54,066
1932.....	41	4,076	268	2,752	309	6,828
1933*.....	256	39,060	666	9,371	944	49,234
1934*.....	322	85,967	618	9,059	998	97,071
1935.....	375	74,894	255	7,144	628	82,038
1936.....	272	63,123	529	11,433	801	74,556
1937.....	546	124,594	399	9,137	945	133,731
1938*.....	218	72,982	252	6,445	518	80,989

* Total for Canada includes 22 tons valued at \$853 produced in British Columbia in 1933, 58 tons valued at \$2,045 in 1934 and 48 tons at \$1,562 in 1938.

Table 242.—Production of Mica in Canada, by Grades, 1937 and 1938

	1937			1938		
	Quantity	Value, f.o.b. shipping point	Price per pound	Quantity	Value, f.o.b. shipping point	Price per pound
	Pounds	\$	\$	Pounds	\$	\$
Rough cobbled.....	106,917	12,090	0.11	12,000	360	0.03
Knife-trimmed.....	203,961	66,852	0.33	81,127	45,419	0.56
Thumb-trimmed.....	173,519	11,826	0.07	17,050	4,366	0.26
Splittings.....	72,500	32,495	0.45	51,434	22,456	0.44
Scrap (*).....	1,333,479	10,468	0.008	875,415	8,388	0.009
Total.....	1,890,376	133,731		1,037,026	80,989	

(*) Includes ground mica.

Table 243.—Imports and Exports of Mica, 1937 and 1938

	1937		1938	
	Pounds	Value	Pounds	Value
IMPORTS—		\$		\$
Mica and manufactures of, n.o.p.—				
From—United Kingdom.....		9,298		11,603
United States.....		52,654		53,602
British India.....		21,165		21,583
Germany.....		408		1
Other countries.....		71		14
Total.....		83,596		86,803
Chalk, China, Cornwall or cliff stone and mica schist.....		55,558		22,572
EXPORTS—				
Mica, rough cobbled, knife-trimmed and thumb-trimmed—				
To—United Kingdom.....	127,700	77,332	68,800	46,784
United States.....	113,500	19,675	24,900	3,864
Other countries.....	13,200	1,897	24,500	7,312
Mica, scrap and waste—				
To—United States.....	2,443,300	13,042	1,288,600	7,649
Mica splittings—				
To—United Kingdom.....				
United States.....	131,600	56,970	13,200	5,810
Japan.....	1,000	444	35,800	16,333
Mica plate and manufactures of (micanite).....		2,410		1,507
Total.....		171,770		89,259

Table 244.—Consumption of Mica in Canada by Industries, as Reported to the Annual Census of Industry, 1937 and 1938

	1937		1938	
	Quantity	Cost at works	Quantity	Cost at works
	Tons	\$	Tons	\$
In Electrical Apparatus Industry.....		87,829		66,877
In Rubber Industry.....	71	6,190	64	6,039
In Roofing Industry.....	(b) 152	4,425	(a) 215	13,040
In Mica Manufacturing Industry.....	21	16,675	28	13,416
Total accounted for.....		115,119		99,372

(a) Includes mica used in manufacture of wall paper and 13 tons valued at \$445 used by coal tar distillation industries.

(b) Includes 9 tons at \$284 used by coal tar distillation industry.

CANADIAN DEALERS' QUOTATIONS AT THE END OF 1937 WERE AS FOLLOWS—

Knife trimmed sheet	Per pound	Splittings	Per pound
	\$		\$
1 x 3 inches.....	0.50	1 x 1 inches.....	0.45
2 x 3 inches.....	0.75	1 x 2 inches.....	0.50
2 x 4 inches.....	1.00		
3 x 5 inches.....	1.75		
4 x 8 inches.....	2.25		
5 x 8 inches.....	3.00		

Ground mica, 20 mesh, \$25 per ton; 60 mesh, \$30; 120 mesh, \$45; all prices f.o.b. Ottawa, in ton lots. (Bureau of Mines, Ottawa.)

The Engineering and Mining Journal, New York (Metal and Mineral Markets) quoted United States mica prices, November, 1938, as follows: per ton, f.o.b. New Mexico, scrap, white, \$14; off color, \$10. Punch, white, for disks, per pound, 12 cents; for washers, 9 cents. Per ton, f.o.b. New Hampshire, roofing mica, \$23; snow, \$34; 40 mesh white, \$40; 60 mesh, \$48; 100 mesh, \$60; 200 mesh, \$75. Clean dry mixed bench and mine scrap, \$13. Per pound, f.o.b. North Carolina, punch, 3 to 5 cents; $\frac{1}{2}$ x 2 inch, 15 to 40 cents; 2 x 2, 30 to 60 cents; 3 x 3, 75 cents to \$1.20; 3 x 4 inch, \$1 to \$1.40; 3 x 5, \$1.25 to \$1.60; 4 x 6, \$2 to \$2.50; 6 x 8, \$2.50 to \$3.50; 8 x 10, \$3.50 to \$5; these prices apply to No. 1 and No. 2 quality stock. Stained qualities take from 10 to 25 per cent discount. White North Carolina mica, 70 mesh, \$60 to \$80 per ton. Biotite or black mica, \$15 a ton unground. White, Georgia, 300 mesh, \$19.50; sericite, 300 mesh, \$15; mica schist, 20 mesh, \$14; Prices for corresponding grades, early in 1939 remained approximately the same as those quoted above.

Table 245.—Principal Statistics of the Mica Mining Industry in Canada, 1937 and 1938

	1937	1938		
	Canada (*)	Quebec	Ontario	Canada (*)
Number of firms or operators.....	34	31	8	40
Capital employed..... \$	150,569	124,942	34,816	159,758
Number of employees—On salary.....	9	8	1	9
On wages.....	190	136	11	147
Total.....	199	144	12	156
Salaries and wages—Salaries..... \$	7,766	5,119	1,300	6,419
Wages..... \$	89,781	63,638	4,367	68,005
Total..... \$	97,547	68,757	5,667	74,424
Selling value of products (gross)..... \$	133,731	72,982	6,445	80,989
Cost of fuel and electricity..... \$	3,768	5,529		5,529
Cost of process supplies used..... \$	13,778	13,718		13,718
Selling value of products (net)..... \$	116,185	53,735	6,445	61,742

(*) Does not include data for one operation in British Columbia for which statistics are not available.

Table 246.—Capital Employed in the Mica Mining Industry in Canada, by Provinces, 1938

	Quebec	Ontario	Canada†
	\$	\$	\$
CAPITAL EMPLOYED AS REPRESENTED BY—			
(a) Present cash value of the land (excluding minerals).....	40,827	25,861	66,688
(b) Present value of buildings, fixtures, machinery, tools and other equipment..	23,737	5,049	28,786
(c) Inventory value of materials on hand, ore in process, fuel and miscellaneous supplies on hand.....	26,481	2,485	28,966
(d) Inventory value of finished products on hand.....	455	1,082	1,537
(e) Operating capital (cash, bills and accounts receivable, prepaid expenses, etc.)	33,442	339	33,781
Total	124,942	34,816	159,758

† Does not include data for 1 property in British Columbia.

Table 247.—Number of Wage-earners on Payroll or Time Record on 15th of Each Month or Nearest Representative Date, 1937 and 1938

Month	1937			1938		
	Mine	Shop		Mine	Shop	
		Male	Female		Male	Female
January.....	63	48	2	96	68	.....
February.....	87	53	2	100	55	.....
March.....	88	59	2	89	38	.....
April.....	90	61	3	83	37	.....
May.....	103	66	9	101	38	.....
June.....	100	73	9	103	43	.....
July.....	117	94	11	108	33	.....
August.....	111	94	12	104	51	.....
September.....	108	101	20	116	42	.....
October.....	101	105	11	112	35	.....
November.....	106	99	6	108	31	.....
December.....	88	81	4	74	30	.....

Table 248.—World Production of Mica, 1937 and 1938

(Imperial Institute, London)

(Long tons)

Producing Country	1937	1938	Producing Country	1937	1938
BRITISH EMPIRE			FOREIGN COUNTRIES		
Northern Rhodesia.....	4	4	Italy.....	24	120
Southern Rhodesia.....	16	13	Norway (exports).....	41	102
Tanganyika Territory—			Roumania.....	27	22
Sheet.....	33	22	Sweden.....	67	129
Waste.....	40	14	Eritrea.....	(a)	(a)
Union of South Africa (scrap).....	1,712	1,098	Madagascar.....	574	667
Canada—			United States (sales)—		
Knife trimmed.....	91	37	Sheets (uncut).....	756	410
Thumb trimmed.....	78	1	Scrap.....	22,496	18,087
Splittings.....	32	23	Argentina.....	221	(a)
Rough cobbled.....	48	.....	Bolivia (exports).....	9	4
Scrap.....	595	276	Brazil (exports).....	325	513
Ceylon (exports).....	1	.....	Peru (exports).....	5	24
India (exports)—			Korea.....	(a)	(a)
Blocks.....	1,500	942			
Splittings.....	7,467	4,713			
Scrap.....	5,900	3,101			
Australia.....	84	65			

Mica is also produced in the U.S.S.R.

(a) Information not available.

(c) Converted from cubic metres at the rate of 1 cubic metre=2 long tons.

The following amounts of lithia mica were produced (long tons):—

	1937	1938
South West Africa.....	1,030	.....
Canada.....	(£342)	.....
France.....	(a)	(a)
Portugal.....	109	.....
United States (lithium minerals).....	1,212	796
Argentina.....	181	(a)

THE SALT INDUSTRY

Commercial production of common salt or sodium chloride in Canada during 1938 totalled 440,045 short tons valued at \$1,912,913 compared with 458,957 short tons at \$1,799,465 in 1937. In 1938 salt was produced in Nova Scotia, Ontario, Manitoba and Alberta and of the total Canadian output in 1938. Ontario contributed 388,130 short tons or 88 per cent. Statistics of Canadian salt production represent the recovery of the mineral from brine wells with the exception of Nova Scotia where the output comes entirely from the underground mining of rock salt deposits.

Of the total salt used or sold in 1938 there were 170,938 short tons or 39 per cent consumed directly by the producers themselves in the manufacture of caustic soda and other chemicals. Table and dairy grades sold were recorded at 85,422 short tons, 10,174 tons were reported as sold as highway salt while the balance of production totalling 258,933 short tons included common fine, common coarse and various other grades.

Table 249.—Production of Salt in Canada, by Grades, 1937 and 1938

Grade	1937			1938		
	Manu- factured	Sold	Value of salt sold (*)	Manu- factured	Sold	Value of salt sold (*)
	Tons	Tons	\$	Tons	Tons	\$
Table, dairy and pressed blocks.....	78,641	76,908	810,090	83,323	85,422	876,204
Common, fine.....	104,203	104,968	404,598	101,949	104,174	418,810
Common, coarse.....	22,558	23,676	182,228	32,446	30,613	253,384
Highway salt.....	1,969	1,969	6,229	5,778	10,174	34,689
Land salt.....	42	89	466	88	71	397
Other grades.....	45,695	46,198	190,705	44,214	38,653	158,491
Brine for chemical works (salt equivalent sold or used).....	205,149	205,149	205,149	170,938	170,938	170,938
Total.....	458,557	458,957	1,799,465	438,736	440,045	1,912,913
Value of containers.....			534,551			576,806
Grand Total.....	458,557	458,957	2,334,016	438,736	440,045	2,489,719

(*) Not including containers.

Table 250.—Production of Salt, by Provinces*, 1929-1938

Year	Nova Scotia		Ontario		Manitoba		Saskatchewan	
	Tons	\$	Tons	\$	Tons	\$	Tons	\$
1929.....	27,819	157,662	302,445	1,420,424				
1930.....	23,058	136,226	248,637	1,558,405				
1931.....	27,718	143,761	231,329	1,760,388				
1932.....	31,897	150,708	231,138	1,789,751	508	7,092		
1933.....	34,278	161,889	244,107	1,755,087	1,499	18,388	231	4,510
1934.....	42,886	191,917	276,751	1,734,196	1,664	20,137	452	8,703
1935.....	38,701	161,659	320,003	1,698,508	1,538	18,765	101	2,046
1936.....	38,774	183,915	350,044	1,557,078	2,498	32,151		
1937.....	47,865	216,401	407,701	1,539,599	3,391	43,465		
1938.....	44,950	194,759	388,130	1,637,140	2,920	34,979		

(*) In addition Alberta produced 4,045 tons at \$46,035 in 1938.

Table 251.—Production of Salt in Canada, 1929-1938

Year	Tons	\$
1929.....	330,264	1,578,086
1930.....	271,695	1,694,631
1931.....	259,047	1,904,149
1932.....	263,543	1,947,551
1933.....	280,115	1,939,874
1934.....	321,753	1,954,953
1935.....	360,343	1,880,978
1936.....	391,316	1,773,144
1937.....	458,957	1,799,465
1938.....	440,045	1,912,913

Table 252.—Production in Canada, Imports, Exports and Consumption of Salt, 1937 and 1938

	1937		1938	
	Tons	Value	Tons	Value
		\$		\$
PRODUCTION.....	458,957	1,799,465	440,045	1,912,913
IMPORTS—				
Salt, for the use of the sea or gulf fisheries.....	38,643	106,703	39,016	110,808
Salt, in bulk, n.o.p.....	48,186	168,998	44,691	169,039
Salt, n.o.p., in bags, barrels, etc.....	29,576	189,286	24,383	172,742
Salt, table, made by an admixture of other ingredients, when containing not less than 90 per cent of pure salt.....	55	1,203	41	1,176
Total.....	116,460	466,190	108,131	453,765
EXPORTS.....	9,329	61,522	11,844	68,293
APPARENT CONSUMPTION OF SALT.....	566,088	2,204,133	536,332	2,298,385

Table 253.—Available Statistics on Consumption of Salt, in Specified Canadian Industries, 1937 and 1938*

Industries	1937		1938	
	Quantity used	Cost at works	Quantity used	Cost at works
	Pounds	\$	Pounds	\$
Fish canning and curing (factories only).....	40,634,000	208,510	38,146,100	206,797
Slaughtering and meat packing.....	80,296,715	460,248	72,938,200	391,772
Acids, alkalies and salts—brine (salt content) and dry salt.....	475,555,413	383,549	398,870,603	332,411
Soaps and cleaning preparations.....	4,017,429	14,958	3,833,557	14,015
Dyeing, cleaning and laundry work.....	5,106,053	36,238	5,155,651	35,282
Dyeing and finishing of textiles.....	2,086,511	8,330	1,971,890	7,972
Artificial ice.....	1,998,376	7,176	1,435,067	6,212
Abrasives—artificial.....	676,000	2,786	406,000	1,784
Waterworks.....	1,600,000	(b)	(b)	(b)
Leather tanneries.....	9,480,760	39,288	10,868,261	40,280
Pulp and paper mills.....	(d)	63,787	20,686,000	68,485
Stock and poultry foods.....	3,454,000	22,505	4,150,000	27,016
Bread and other bakery products.....	16,919,700	150,569	11,076,372	140,230
Fruit and vegetable preparations.....	9,547,982	63,585	10,108,280	59,102
Biscuits, confectionery, etc.....	1,551,300	13,056	1,771,000	19,043
Foods, breakfast.....	1,693,494	11,864	1,655,734	10,768
Sausage and sausage casings.....	655,897	6,311	1,455,923	7,958
Ice cream industry (c).....	1,314,500	10,516	1,200,000	9,561
Breweries.....	602,351	8,355	280,544	2,809
Malt and malt products.....	261,119	1,370	265,605	1,179
Coffee, tea and spices.....	368,491	3,036	237,863	2,371
Macaroni, vermicelli, etc.....	78,796	728	94,940	770
Ice cream cones.....	4,127	30	4,279	33
Foods, miscellaneous.....	823,172	8,581	937,764	9,596
Butter and cheese.....		156,356		164,815
Starch and glucose.....	396,090	1,198	386,043	1,189

(*) In addition, large quantities of salt are used on highways.

(b) Not compiled in 1938.

(c) Quantities estimated.

(d) Not available.

NOTE.—In addition a relatively small quantity of salt is used in the manufacture of woollen textiles.

Table 254.—Principal Statistics of the Salt Industry in Canada, 1937 and 1938

	1937	1938
Number of firms.....	9	9
Capital employed.....	\$ 4,001,568	4,270,799
Number of employees—On salary—Male.....	86	78
Female.....	41	37
Total.....	127	115
On wages—Male.....	382	415
Female.....	34	32
Total.....	416	447
Grand Total.....	543	562
Salaries and wages—Salaries.....	\$ 260,753	278,478
Wages.....	392,383	508,242
Total.....	653,136	786,720
Selling value of products (gross).....	\$ 2,334,016	2,489,719
Cost of purchased process materials.....	75,947	30,369
Cost of fuel and electricity.....	183,117	278,711
Value of containers.....	534,551	576,806
Net value of sales.....	1,540,401	1,603,833

Table 255.—Capital Employed in the Salt Industry in Canada, 1938

	\$
Capital employed as represented by—	
Present cash value of the land (excluding minerals).....	809,021
Present value of buildings, fixtures, machinery, tools and other equipment.....	2,541,432
Inventory value of materials on hand, salt in process, fuel and miscellaneous supplies on hand.....	238,262
Inventory value of finished products on hand.....	142,690
Operating capital (cash, bills and accounts receivable, prepaid expenses, etc.).....	539,394
Total.....	4,270,799

Table 256.—Wage-earners, by Months, 1937-1938. (On 15th or nearest representative date)

Month	1937	1938		
		Male		Female
		Surface	Underground	Surface
January.....	348	338	42	31
February.....	370	368	48	30
March.....	376	360	52	29
April.....	401	372	50	30
May.....	429	366	52	30
June.....	427	343	50	30
July.....	452	365	44	30
August.....	444	367	40	31
September.....	451	395	44	38
October.....	437	396	47	44
November.....	456	392	45	37
December.....	371	354	44	28
Average.....	416	368	47	32

Table 257.—World Production of Salt, 1937 and 1938

(Imperial Institute)

(Long tons)

Producing Country and Description	1937	1938	Producing Country and Description	1937	1938
BRITISH EMPIRE			BRITISH EMPIRE—Con.		
Great Britain—			Aden.....	355,166	278,047
Rock-salt.....	18,371	19,658	Burma.....	53,813	38,098
Brine-salt.....	3,052,518	2,610,048	Ceylon.....	38,202	35,914
Northern Ireland—			Cyprus (estimated).....	3,000	3,000
Rock-salt.....	4,187	2,325	India—		
Brine-salt.....	8,679	5,666	Rock-salt.....	187,100	188,372
Malta.....	1,800	1,800	Other salt.....	1,305,921	1,351,291
Mauritius (estimated)—			Palestine—		
Sea-salt.....	1,500	1,500	Rock-salt.....	716	437
Nigeria (estimated).....	400	400	Sea-salt.....	11,532	7,938
Somaliland (exports)—			Australia—		
Sea-salt.....	935	347	Western Australia.....	3,670	3,789
South West Africa.....	4,048	4,991	South Australia.....	73,558	74,812
Anglo-Egyptian Sudan.....	34,007	(a)	Total*.....	5,700,000	5,200,000
Kenya.....	(a)	3,199	Total Foreign Countries*..	29,000,000	27,000,000
Tanganyika Territory.....	8,585	10,006	World Total*.....	35,000,000	32,000,000
Uganda.....	3,084	3,119			
Union of South Africa (b).....	(a)	(a)			
Canada.....	409,426	392,897			
British West Indies (exports)—					
Sea salt—					
Bahamas.....	4,924	4,754			
Turks and Caicos Islands.....	50,030	35,016			

(a) Information not available.

(b) Years ended June 30.

* Salt is also produced in many countries for which statistics are not available, e.g., Gold Coast, Spain, Bolivia.

TALC AND SOAPSTONE INDUSTRY

The value of crude and refined talc and soapstone sold by Canadian producers of these minerals in 1938 totalled \$144,848 compared with a corresponding value of \$163,814 in 1937 and \$177,270 in 1936. Production of soapstone during 1938 came entirely from the Eastern Townships of the province of Quebec while the output of higher grade talc represented shipments of the mineral made from deposits (Conley and Henderson mine) occurring near Madoc, Hastings county, Ontario. During recent years a relatively small tonnage of talc was shipped from a property operated at Anderson Lake in the Lillooet mining district of British Columbia, however, no talc mining operations were reported in this province during either 1937 or 1938.

The talc of the Madoc area is of foliated type, has a good white colour, and occurs as a series of vertical veins or bands in white crystalline dolomite. Near Broughton, in Quebec, crude lump talc, from a band cutting the soapstone body, and soapstone waste are shipped to a Montreal grinding plant. In addition to its use as a furnace material, Quebec soapstone is utilized in the manufacture of stoves, mantels, interior trim, ornaments, crayons, etc.

In 1938, both surface and underground work was conducted on a talc deposit located in range II of Potton township, Brome county, Quebec. The company developing this property reported that a mill was constructed and a railroad siding completed at Highwater, Quebec, during the year under review.

According to the Bureau of Mines, Ottawa, pyrophyllite, a hydrous silicate of alumina closely resembling talc in appearance and certain physical properties, but of less common occurrence, is becoming industrially important for many of the same uses as talc: it does not flux when fired, however, as does talc, and has been shown to have value for the manufacture of high-grade, refractory ceramic products and cements. The only recorded occurrence of the mineral in Canada appears to be at Kyuquot Sound on the west coast of Vancouver Island; some work was done on the deposit around 1910.

In November, 1938, a shipment of 1,000 tons of pyrophyllite was made from a deposit occurring near Manuels, Conception Bay, Newfoundland. The mineral went to Newark, New Jersey, U.S.A. for grinding; it is reported that the ground product will be disposed of to the cosmetic trade and possibly will also be used in paints, textiles, enamels, and as a paper and rubber filler.

According to the United States Bureau of Mines, the United States market for talc, pyrophyllite, and ground soapstone is the largest in the world. It not only consumes most of the large domestic production of the crude material but also absorbs the hundreds of tons of foreign talc imported each year. Imports into the United States in 1938 were—crude and unground steatite and French chalk, 337 short tons valued at \$5,956 and manufactures (except toilet preparations) wholly or partially finished, 21,790 short tons valued at \$385,242. The market takes most of these materials in the ground state, 98 per cent of the sales of talc in the United States being ground material. Less than 1 per cent is in the form of sawed and manufactured material and the rest is crude. Markets exist in many industries, principally, however, in the paint, ceramics, roofing, paper and rubber industries, which in 1938 bought 77 per cent of the total sales of domestic material; paint manufacture is still the principal consumer.

Trade agreements between Canada and the United States and between the United Kingdom and the United States were signed at Washington on Thursday, November 17, 1938. The following statement, prepared by the United States Tariff Commission, shows the former and new rates of duty on talc in schedule II (United States concessions to Canada), and the total imports of talc into the United States and the imports from Canada, according to preliminary United States statistics for the year 1937: Talc, steatite, or soapstone, ground, etc., (except toilet preparations), valued at not more than \$14 per ton (1936 agreement covered talc valued at not more than \$12.50 per ton): rate of duty under Tariff Act of 1930, 35 per cent, under 1935 agreement, 25 per cent, under new agreement, 17½ per cent. Total value of all 1937 talc imports, \$102,015 (a); value of 1937 talc imported from Canada, only, \$52,484 (a). (a—includes only talc, etc., valued at not more than \$12.50 per ton.)

"Canadian Chemistry and Process Industries", Toronto, September, 1939 quotations for talc were—all grades f.o.b. Madoc, Ontario—per ton—fine blown—Red label \$30; No. 2 Green label \$18; 1 SS white label \$12; O Blue label \$10; 3A Blue label \$8.00. Imported Italian talc \$80-\$100.

"Metal and Mineral Markets", New York, October, 1939—Quotations for talc were: Per ton, carload lots, f.o.b. works, containers included unless otherwise specified: Georgia: 98 per cent through 200 mesh, gray, \$6; white, \$8. In bags \$1.00 per ton extra. New Jersey: mineral pulp, ground, \$8.50 to \$10.50, bags extra. New York: Double air floated, short fibre, 325 mesh \$12 to \$15. Vermont: 99½ per cent through 200 mesh, extra white, bulk basis, \$9.50; 97 per cent through 200 mesh, medium white, \$9; packed in paper bags, \$1.00 per ton extra. Virginia: 200 mesh, \$4.75 to \$5.50; 325 mesh \$6.20 to \$7; crude \$4.

Imports into Canada of talc or soapstone, ground or unground, totalled 2,647 short tons valued at \$40,386 in 1938 compared with 3,183 short tons at \$48,079 in 1937; of the 1938 imports 2,301 short tons worth \$31,214 came from the United States. Exports of talc from Canada in 1938 totalled 6,951 short tons valued at \$70,742 as against 8,698 short tons at \$85,953 in 1937; of the 1938 exports 6,228 short tons worth \$64,629 went to the United States.

During the year under review there were six firms reported as active in the industry, 5 in Quebec and one in Ontario; 5 of these made commercial shipments. Capital employed by active operators totalled \$212,491; employees numbered 75 and salaries and wages distributed amounted to \$59,426. Fuel and purchased electricity used were appraised at \$15,993 and the cost of explosives and other process supplies was reported at \$9,000. The net value of sales was estimated at \$120,941 in 1938 compared with \$138,420 in 1937 and \$143,878 in 1936.

Table 258.—Production (Sales) in Canada, Imports and Exports of Talc and Soapstone, 1937 and 1938

	1937		1938	
	Quantity	Value	Quantity	Value
	Tons	\$	Tons	\$
PRODUCTION—				
Soapstone (Quebec) (a).....		40,513		35,038
Talc—Ontario.....	12,457	123,301	10,853	109,810
British Columbia.....				
Total Canada.....		163,814		144,848
IMPORTS—				
Talc or soapstone, ground or unground—				
From—United Kingdom.....				
United States.....	2,812	38,660	2,301	31,214
Italy and Other Countries.....	371	9,419	346	9,172
Total Imports.....	3,183	48,079	2,647	40,386
EXPORTS—				
Talc—				
To—United Kingdom.....	1,200	10,858	675	5,654
United States.....	7,453	74,686	6,228	64,629
Other Countries.....	45	409	48	459
Total Exports.....	8,698	85,953	6,951	70,742

(a) Shipments usually include relatively small quantities of material classified as low grade talc.

Table 259.—Production of Talc and Soapstone in Canada, 1934-1938

Year	Value	Year	Value
	\$		\$
1934.....	180,777	1937.....	163,814
1935.....	171,532	1938.....	144,848
1936.....	177,270		

Table 260.—Consumption of Talc in Canada, by Industries, as Reported in the Annual Census of Manufactures, 1937 and 1938

Industry	1937		1938	
	Short tons	Cost at works	Short tons	Cost at works
		\$		\$
Rubber Industry.....	607	11,449	540	10,641
Electrical Apparatus.....	209	5,266	149	3,853
Paints.....	2,063	50,394	2,330	63,788
Soaps and Cleansing Preparations.....	151	3,123	241	4,437
Toilet Preparations.....	401	18,976	382	18,934
Polishes.....	16	330	17	559
Products from Imported Clays.....	110	1,460	160	2,119
Prepared Roofing.....	2,696	25,194	2,414	24,374
Pulp and Paper.....	865	16,385	1,051	17,552

(a) Not yet complete.

Table 261.—Principal Statistics of the Talc and Soapstone Industry in Canada, 1937 and 1938

	1937	1938
Number of firms.....	7	(a) 6
Capital employed.....\$	625,497	212,491
Number of employees—On salary.....	11	5
On wages.....	72	70
Total.....	83	75
Salaries and wages—Salaries.....\$	20,474	9,660
Wages.....\$	51,546	49,766
Total.....\$	72,020	59,426
Selling value of products (gross).....\$	163,814	144,848
Cost of fuel and purchased electricity.....\$	19,318	15,993
Cost of explosives and other process supplies.....\$	6,076	7,914
Selling value of products (net).....\$	138,420	120,941

(a) 5 firms in Quebec and 1 in Ontario.

Table 262.—Capital Employed, by Classes*, 1938

	1938
	\$
Present value of lands, buildings, fixtures, machinery, tools and other equipment.....	178,754
Inventory value of materials on hand, stocks in process, fuel and miscellaneous supplies on hand.....	2,724
Inventory value of finished products on hand.....	11,115
Operating capital.....	19,898
Total.....	212,491

(*) By active firms.

Table 263.—Wage-earners, by Months, 1937 and 1938

Month	1937	1938		
		Surface	Underground	Mill
January.....	58	27	30	14
February.....	57	27	24	13
March.....	56	14	18	13
April.....	73	41	13	11
May.....	58	50	16	13
June.....	60	40	14	13
July.....	78	51	15	14
August.....	77	51	15	14
September.....	94	45	20	14
October.....	92	43	20	12
November.....	78	40	20	13
December.....	66	33	18	11

Table 264.—World's Production of Talc, 1937 and 1938

(Taken from the Imperial Institute's Publication—The Mineral Industry of the British Empire and Foreign Countries)

(Long tons)

Producing Country	1937	1938	Producing Country	1937	1938
BRITISH EMPIRE			FOREIGN COUNTRIES—Cob.		
Tanganyika Territory.....		37	Italy.....	44,987	52,662
Union of South Africa.....	370	1,529	Norway.....	28,998	(a)
Canada (sales) (b).....	11,122	9,600	Roumania.....	1,945	1,883
India.....	13,040	17,990	Sweden.....	7,812	6,690
Australia.....	1,494	958	Egypt.....	2,230	1,231
FOREIGN COUNTRIES			Morocco (French) (exports).....	828	(a)
Austria (estimated).....	25,000	(a)	United States (sales).....	205,356	189,978
Finland.....	867	(a)	Argentina.....	205	(a)
France.....	55,400	(a)	Uruguay (exports).....	430	937
Germany (Bavaria).....	7,667	(a)	French Indo-China.....	421	
Greece.....	1,809	(a)	Manchuria.....	109,384	79,932

Talc is also produced in U.S.S.R., Spain, and China.

(a) Information not available.

(b) Excluding soapstone, which is only recorded by value and was as follows:—

1936.....	£6,600	1937.....	£8,200	1938.....	£7,100
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MISCELLANEOUS INDUSTRIAL OR NON-METAL MINING INDUSTRIES

Included in this section are the following non-metallic minerals and mineral products:—

Barytes	Grindstones	Silica Brick
Corundum	Kyanite	Sodium Carbonate
Diatomite	Lithium Minerals	Sodium Sulphate
Fluorspar	Magnesitic Dolomite	Strontium Minerals
Garnet	Magnesium Sulphate	Sulphur (Pyrites)
Graphite	Natural Mineral Waters	
	Phosphate	

Canadian operators producing certain industrial minerals, and who are usually relatively few in number, have been segregated for statistical purposes into a single group designated as the Miscellaneous Non-Metal Mining Industry. Minerals or primary mineral products produced (or deposits developed) by this industry during 1938 included: Barytes diatomite, fluorspar, garnets, graphite, grindstones, lithium minerals, magnesitic-dolomite (crude and refined), magnesium sulphate, mineral waters, phosphate, silica brick, sodium carbonate, and sodium sulphate. For convenience, the sulphur content of pyrites shipped, sulphur recovered from smelter gas, and peat are recorded with the various miscellaneous minerals listed above; the value of sulphur production, however, is not included in the total for the miscellaneous non-metallic or industrial minerals as the value of this element is credited to the copper-gold-silver mining and non-ferrous smelting industries.

The number of firms reported as active in the industry during 1938 was 50; capital employed totalled \$2,787,671; employees numbered 394 and salaries and wages paid amounted to \$475,567. The cost of fuel, purchased electricity and process supplies used during the year was reported at \$409,229 and the gross value of production totalled \$1,188,322 compared with \$1,687,317 in 1937.

BARYTES

Barytes production in Canada during past years came largely from deposits in Nova Scotia, Quebec and Ontario and in recent years more particularly from deposits in the Lake Ainslie district, Nova Scotia. Prior to 1939 the last commercial shipments from Canadian deposits were made in 1933 in which year 20 tons valued at \$60 were produced and shipped at the Tionaga mine, Penhorwood township, Ontario. The mineral also occurs in British Columbia.

Ground barite is used as a heavy, white, inert filler in many products, such as paint, paper, rubber, oilcloth, linoleum, plastics, resins, and cloth. It is also used in the manufacture of glass and as a heavy medium in mud in the drilling of deep oil wells where high gas pressures are encountered. The most important single chemical product made from barite is lithopone, an intimate mixture of zinc sulphide and barium sulphate prepared by co-precipitation by double decomposition of solutions of barium sulphide and zinc sulphate; its chief use is as a white pigment. The average value F.O.B. mine shipping point, of crude barite for the entire United States, as calculated from reports by producers to the United States Bureau of Mines, increased from \$6.30 in 1937 to \$6.47 in 1938.

Germany is the largest world producer of barytes and consumption of the mineral in that country has increased during recent years owing to the demand for barytes and its derivatives in the manufacture of paints, pigments, ceramics, explosives, rubber goods, etc. The German use of barytes in pigments has expanded recently on account of official requirements for mixing barytes with red lead in order to extend the supplies of red lead. The United States and Great Britain are also large producers of barytes.

During the first six months of 1939 Canada Baryte Mines Ltd., made commercial shipments of crude barite from a property located in Langmuir township, Porcupine District, Ontario. Barytes was also shipped during 1939 from a deposit occurring in the Temagami district of Northern Ontario. Production of barite in Canada from 1885 to 1933, inclusive, totalled 41,027 short tons valued at \$300,610.

Table 265.—Barytes and Blanc Fixe Used by the Canadian Paints, Pigments and Varnishes Industry in Canada, 1934-1938

Year	Barytes		Blanc Fixe (*)	
	Pounds	\$	Pounds	\$
1934.....	2,393,330	44,690	93,918	2,481
1935.....	2,308,628	43,702	141,975	4,223
1936.....	2,533,275	41,687	97,016	3,148
1937.....	2,630,366	42,821	125,743	4,136
1938.....	2,729,212	46,288	116,545	3,287

(*) Artificial barium sulphate.

Table 266.—Imports of Blanc Fixe, Lithopone and Barytes into Canada, 1934-1938

Year	Lithopone		Barytes		Blanc Fixe	
	Tons	Value	Tons	Value	Tons	Value
		\$		\$		\$
1934.....	7,265	510,558	3,113,800	26,937	968,201	21,638
1935.....	8,692	620,615	4,278,400	33,739	1,139,106	25,759
1936.....	9,429	666,667	3,316,000	26,554	1,064,032	21,480
1937.....	11,081	777,752	14,156,600	32,869	1,068,199	21,162
1938.....	8,865	632,273	(a) 4,373,100	38,012	629,258	13,779

† 2,637,700 pounds from Germany, 852,700 pounds from the United States and 492,900 pounds from the United Kingdom.
 (a) 325,900 pounds from United Kingdom, 2,532,800 from Germany, and 1,124,600 from United States.

Table 267.—World Production of Barium Minerals, 1937 and 1938

(Imperial Institute, London)

(Long tons)

Producing Country and Description	1937	1938	Producing Country and Description	1937	1938
BRITISH EMPIRE			FOREIGN COUNTRIES—Con.		
United Kingdom—			Germany—		
Barytes, unground.....	36,875	47,568	Baden.....	21,311	
Witherite, unground.....	11,882	9,914	Bavaria.....	11,645	
Barytes—			Prussia.....	404,149	470,000
Ground, bleached.....	5,427	4,011	Saxony.....	425	
Ground, unbleached.....	19,124	14,825	Thuringia.....	6,683	
Southern Rhodesia.....		89	Wurtemberg.....	189	
Union of South Africa.....	561	483	Greece.....	38,722	(a)
India.....	15,689	8,075	Italy.....	44,488	47,408
Australia.....	3,103	2,863	Norway.....	69	(a)
			Portugal.....	99	22
			Egypt.....	50	20
FOREIGN COUNTRIES			Cuba.....	3,788	(a)
Austria.....	841	(a)	United States.....	322,212	299,494
France.....	19,550	(a)	French Indo-China.....	44	49
			Japan.....	(a)	(a)
			Korea.....	(b) 10,872	(b) 15,481

Barytes is also produced in Czechoslovakia, Spain, U.S.S.R. and China.

(a) Information not available.

(b) Exports.

CORUNDUM

Corundum is found in an area embracing several townships in Renfrew and Hastings counties in the Province of Ontario. Corundum mining as an industry made its appearance there in 1900 and production reached a maximum in 1906. Shipments of the mineral in Canada during the period 1900-1921 totalled 19,524 short tons valued at \$2,104,251. No commercial shipments have been reported since 1921. No imports of corundum into Canada were shown in Customs reports for either 1937 or 1938. United States demand for crude corundum in 1938 was met by the importation of 2,098 tons valued at \$138,629, chiefly from the Union of South Africa. Virtually all corundum and emery is imported into the United States in the crude state and crushed

and graded in that country for the domestic market. Production of corundum in the Union of South Africa in 1938 totalled 1,540 short tons valued at £12,454 and the Department of Mines of that country reports that with the depletion of the known eluvial deposits it has become increasingly difficult to maintain supplies of crystal corundum and during 1938 activity on the fields fell off considerably. Negotiations were proceeding with a view to persuading the American market, which absorbs practically all the crystals being produced at present, to take the corundum in the form of concentrates.

Imports into Canada in 1938 of manufactures of emery or of artificial abrasives n.o.p. were valued at \$42,345 of which those appraised at \$39,353 came from the United States. Imports of emery in bulk, crushed or ground were valued at \$38,743 in 1938.

Imports of emery in bulk, crushed or ground in 1917 were valued at \$79,176 compared with \$48,995 in 1913; imports of emery and carborundum wheels and manufactures of emery or carborundum were appraised at \$553,660 in 1917 against \$135,654 in 1913.

Artificial corundum or "fused alumina" (Al_2O_3) is produced from calcined bauxite in steel-lined, water-cooled furnaces of the arc type. Canadian production of crude fused alumina in 1937 totalled 86,604 short tons valued at \$8,435,371.

DIATOMITE

Production of diatomite in Canada during 1938 totalled 398 short tons valued at \$13,842 compared with 643 short tons at \$18,606 in 1937. The greater part of the output in 1938, as in former years, came from deposits located near Tatamagouche, Colchester county, Nova Scotia. The balance of production as recorded for 1938 represented primary sales of material previously mined from deposits located in the Cariboo District of British Columbia. Diatomite was also produced in 1937 and previous years from deposits occurring in the Muskoka area, Ontario.

A report issued in 1938 by the Bureau of Mines, Ottawa, states—"Approximately 80 per cent of the diatomite now being consumed in Canada is in the form of filter-pads, about 15 per cent is used for insulation and the remainder is absorbed as a filler, concrete admixture, silver polish base, and in chemicals. Amongst the recent applications, the use of diatomite in the paint and varnish industry has demonstrated its advantages as a flattening agent and as an extender. Deposits containing medium quality diatomite are very common in some parts of Canada. Owing, however, to foreign competition and to the, at present, comparatively small Canadian demand, only the properly prepared diatomite of the highest quality can now be successfully marketed on a scale sufficiently large to warrant the operations of a property and the erection of a plant. The present price in Canada varies from \$35 to \$40 per ton for concrete admixture; \$35 to \$75 for insulation and filtration; up to \$200 in small lots of material suitable for polishes; imported insulation bricks vary from \$85 to \$140 per 1,000, according to grade and density."

Table 268.—Production of Diatomite in Canada, 1929-1938

Year	Short tons	\$
1929.....	429	10,330
1930.....	554	13,247
1931.....	1,610	32,789
1932.....	1,496	29,509
1933.....	1,789	36,648
1934.....	1,372	54,910
1935.....	823	33,140
1936.....	615	13,650
1937.....	643	18,606
1938.....	398	13,842

The total Canadian output of diatomite since 1896 when it was first produced in the Dominion, to the end of 1938, totalled 21,727 short tons valued at \$496,310.

Imports into Canada of diatomaceous earth or infusorial earth (Kieselguhr), ground or unground in 1938 totalled 2,565 short tons valued at \$73,900 compared with 2,197 tons at \$63,917 in 1937. Of the 1938 imports, 2,555 tons worth \$73,449 came from the United States.

A recent British patent describes the manufacture of various iron oxide pigments by mixing iron sulphate or chloride with diatomite, ground quartz, or flint and heating the mixture until the iron compound is decomposed; the ferrous sulphate with diatomite yields a pigment with an orange undertone. If diatomite is roasted with ferric chloride a purple colored pigment is produced; heated without air with ferrous sulphate the product resembles raw sienna.

Table 269.—Consumption of Infusorial Earth by the Canadian Sugar Refining Industry, 1932-1938

Year	Pounds	Value	Year	Pounds	Value
		\$			\$
1932.....	2,577,585	73,309	1936.....	4,375,999	98,954
1933.....	2,507,469	70,191	1937.....	4,586,786	95,532
1934.....	2,562,552	69,116	1938.....	4,908,597	101,473
1935.....	4,307,142	96,560			

Table 270.—World's Production of Diatomaceous Earth, 1937 and 1938

(Supplied by the *Imperial Institute*)

(Long tons)

Producing Country	1937	1938	Producing Country	1937	1938
BRITISH EMPIRE			FOREIGN COUNTRIES—Con.		
Great Britain.....	1,141	2,159	Germany (d).....	7,407	(a)
Northern Ireland.....	7,168	5,281	Italy.....	4,586	5,010
Union of South Africa.....	148	153	Norway (exports).....	106	48
Canada.....	574	355	Portugal.....	109	(a)
Barbados.....	10	10	Roumania (c).....	2,972	(a)
Australia.....	3,190	3,380	Sweden.....	1,736	1,816
FOREIGN COUNTRIES			Algeria.....	12,759	17,800
Bulgaria.....	138	231	United States (b).....	83,228	83,228
Denmark (moler).....	80,000	(a)	Chile.....	340	(a)
Estonia.....	573	1,113	Peru (exports).....		7
Finland.....	1,771	1,574	Japan.....	16,700	21,650
France.....	10,600	(a)	Korea.....	2,480	4,500
			Netherlands East Indies.....	39	140

Diatomaceous earth is also produced in Hungary, Spain, and U.S.S.R. and during 1938 there was a small output in New Zealand valued at £70 (*N.Z.*)

(a) Information not available.

(b) Annual average production 1936-1938.

(c) Converted from cubic metres at the rate of 1 cubic metre=2 long tons.

(d) Production of Hessen only.

FLUORSPAR

Fluorspar production in Canada during 1938 totalled 217 short tons valued at \$3,906 compared with 150 tons at \$2,550 in 1937. Production of the mineral in Canada since 1929 has been confined to the Madoc area, Hastings county, Ontario. Fluorspar was formerly produced at the Rock Candy mine, in British Columbia, by the Consolidated Mining and Smelting Company of Canada, Limited; production in 1929 from this mine totalled 17,800 short tons valued at \$267,000. Following the erection of a large fertilizer plant at Trail, the recovery of by-product fluorine from phosphate rock has obviated the necessity of employing fluorspar as a source of fluorine by the Consolidated Mining and Smelting Company of Canada, Ltd. According to the Bureau of Mines, Ottawa, the whole of such recovery is consumed in the lead refinery, but the company is considering other outlets, such as in the manufacture of sodium fluosilicate, used in the ceramic and glass industries, for laundry purposes, and as an insecticide; lead and zinc fluosilicates, also of value as grasshopper poisons; and ammonia fluosilicate, used as a detergent.

The Department of Public Works and Mines, Nova Scotia, states in its annual report for 1938 that fluorite is associated with barite in veins occurring at East Lake Ainslie, Nova Scotia; a sample from one vein was reported to show a very high fluorite content.

Germany is second only to the United States as a producer of fluorspar, but it has been the chief exporting country. In 1937 according to the United States Bureau of Mines, German production was 144,459 metric tons; and exports were 46,009 metric tons, of which 12,699 metric tons went to the United States.

Shipments of fluorspar from Newfoundland in 1938 were 9,859 short tons, of which 2,539 tons of fluxing grade, 1,116 tons of acid grade, and 1,237 tons of special grade lump (93 to 95 per cent CaF_2) went to Canada. The fluorspar veins in Newfoundland are described as varying in width from 6 inches to 14 feet of solid fluorspar, and in places a width of fluorspar and granite breccia up to 35 feet is to be found.

In 1938 the average selling price f.o.b. Illinois-Kentucky mines of fluorspar shipped to steel plants was \$18 a short ton and that of fluorspar shipped to manufacturers of hydrofluoric acid was \$25.29. The average selling price of imported fluorspar shipped to steel plants was \$20.56 a ton at seaboard (duty paid). Under the Anglo-American trade treaty, the duty on fluorspar containing more than 97 per cent calcium fluoride was decreased from \$5 a short ton to \$3.75 a ton, effective Jan. 1, 1939.

Table 271.—Production of Fluorspar in Canada, 1929-1938

Year	Short tons	\$
1929.....	17,870	268,120
1930.....	80	1,240
1931.....	40	620
1932.....	32	464
1933.....	73	1,064
1934.....	150	2,100
1935.....	75	900
1936.....	75	900
1937.....	150	2,550
1938.....	217	3,906

Table 272.—Imports of Fluorspar into Canada, 1934-1938

Year	Tons	\$
1934.....	7,220	56,628
1935.....	11,591	92,775
1936.....	11,194	95,268
1937.....	11,444	168,082
1938.....	†15,057	212,131

† 6,092 tons at \$87,874 from Newfoundland and 5,005 tons at \$50,421 from France.

Table 273.—Consumption of Fluorspar in Canada, by Uses, as Reported to the Annual Census of Industry, 1937 and 1938

Industries	1937		1938	
	Quantity	Cost at works	Quantity	Cost at works
	Tons	\$	Tons	\$
Steel furnaces.....	9,039	139,181	7,128	119,301
Chemicals (acids, alkalis and salts).....	3,503	52,035	4,652	107,614
Glass.....	91	3,008	112	4,507
Ferro-alloys.....	19	376	.....	.....
Enamelling and glazing.....	130	(a)	120	(a)
Total accounted for.....	12,782	.....	12,012	.....

(a) Not available.

Table 315.—World Production of Fluorspar, 1937 and 1938

(Imperial Institute, London)

(Long tons)

Producing country	1937	1938	Producing country	1937	1938
BRITISH EMPIRE			FOREIGN COUNTRIES—Con.		
United Kingdom.....	42,160	33,331	Germany—Con.		
Southern Rhodesia.....		154	Bavaria.....	61,469	(a)
South West Africa.....		576	Prussia.....	30,032	(a)
Union of South Africa.....	3,558	4,661	Saxony.....	7,946	(a)
Canada.....	134	194	Thuringia.....	15,862	(a)
Australia.....	1,442	3,231	Italy.....	13,174	11,994
Newfoundland.....	12,000	14,000	Norway.....	1,665	(a)
FOREIGN COUNTRIES			U.S.S.R.....	(a)	(a)
France.....	50,650	(a)	Tunis.....	1,676	2,011
Germany—			Mexico (estimated).....	1,000	1,000
Anhalt.....	13,446	(a)	United States.....	163,000	88,000
Baden.....	13,422	(a)	Argentina.....	344	(a)
			Korea.....	(b) 9,532	(b) 33,667

Fluorspar is also produced in Spain and China.

(a) Information not available.

(b) Exports.

GARNETS

No commercial production of garnets has been reported in Canada for several years. In 1938 prospecting and exploratory work were conducted by Garnet Concentrates Inc., on a garnet deposit located in Beaudin township, Abitibi district, Quebec, and in the same province construction work was carried on by Grenat Canada Limitée at a property situated in Joly township, Labelle county; neither of these firms reported commercial shipments during the year under review. The total recorded production of garnets in Canada during past years totalled 1,612 tons valued at \$107,350 and was confined to the years 1923, 1924 and 1927. In 1923 a deposit of garnets in Ashby township, Ontario was operated by the Bancroft mines syndicate; the total production of garnet concentrates and crude garnets amounting to 1,250 tons valued at \$100,000 was shipped to the Carborundum Company Limited, Niagara Falls, N.Y., for use as an abrasive material; the production of garnets in 1924 amounting to 360 tons valued at \$7,200 also originated in Ontario and was shipped to the same company at Niagara Falls, N.Y. In 1927 development work was conducted on a garnet deposit in Joly township, Labelle county, Quebec and a shipment of 2 tons was made.

Garnet is employed chiefly in the manufacture of abrasive papers and cloths while small amounts are utilized in the grinding of plate glass and other products.

No imports of garnet, described as such, were recorded in Canada during 1937 or 1938; the mineral, however, may enter in the form of abrasive paper or combined with other abrasive imports, n.o.p. It has been reported that approximately 175 tons of graded garnet grains are imported annually into Canada. In 1937 the Canadian artificial abrasives industry used 164 short tons of garnets valued at \$28,951 compared with 101 tons at \$17,849 in 1936.

Imports of sandpaper during 1913 were valued at \$171,516 compared with \$331,776 in 1917 and \$317,048 in 1918.

Engineering and Mining Journal's "Metal and Mineral Markets"—New York—October, 1939, quotations for garnet were—per ton, f.o.b. New Hampshire mines; concentrate, \$30; grain, \$80 to \$140. New York: Adirondack garnet concentrates, \$85. Spanish grades, \$60, c.i.f. port of entry. Nominal.

GRAPHITE

Canadian mine production of graphite during 1938 was valued at \$41,590 compared with \$125,343 in 1937. The output in 1938 as in the preceding year came solely from the Black Donald mine, Renfrew county, Ontario. Relatively small and intermittent shipments of graphite were also made from Quebec properties prior to 1935.

The products made from Black Donald ore are well adapted for lubricants and foundry facings. In recent years, the highest grade has been successfully employed in pencil manufacture. During 1938 the Black Donald mine was operated from January 1 to June 30 and the mill intermittently throughout the year; grades shipped included flake, dust and amorphous.

A half dozen or more countries are fairly large graphite producers but, according to the United States Bureau of Mines, none in recent years has challenged the supremacy of Ceylon and Madagascar as producers of high grade graphite; although the tonnage mined in Ceylon and Madagascar seldom exceeds 15 per cent of the world total the value of their products is probably at least half the world total.

"Metal and Mineral Markets"—New York—quoted graphite October 1939 as follows: per pound f.o.b. New York, Ceylon lump, 7 to 7½ cents; carbon lump 6 to 6½ cents; chip, 5½ to 5¾ cents; dust 3 to 4 cents; Madagascar flake 6 to 8 cents; No. 1 flake, 9 to 16 cents; No. 2, 7 cents upwards; fine ground, 55 to 70 per cent carbon, 3 cents upward; amorphous, 3 cents upward. Crude amorphous graphite, f.o.b. New York \$12 to \$23 per ton, according to grade.

Table 274.—Mine Production (Sales) of Graphite in Canada, 1929-1938

Year	Short tons	\$
1929.....	1,461	103,174
1930.....	1,535	96,392
1931.....	548	32,149
1932.....	346	18,483
1933.....	405	18,367
1934.....	1,518	71,424
1935.....	1,782	79,781
1936.....	(a)	88,812
1937.....	(a)	125,343
1938.....	(a)	41,590

The value of mine graphite produced in Canada from 1886 to the end of 1938 totalled \$3,606,925.
(a) Not published.

Table 275.—Production of Graphite in Canada, by Provinces, 1929-1938

Year	Quebec		Ontario		Canada	
	Quantity	Value	Quantity	Value	Quantity	Value
	Tons	\$	Tons	\$	Tons	\$
1929.....	173	12,652	1,288	90,522	1,461	103,174
1930.....	197	9,850	1,338	86,542	1,535	96,392
1931.....	.....	.....	548	32,149	548	32,149
1932.....	.....	.....	346	18,483	346	18,483
1933.....	43	2,222	362	16,145	405	18,367
1934.....	129	6,426	1,389	64,998	1,518	71,424
1935.....	21	1,281	1,761	78,500	1,782	79,781
1936.....	.....	.....	.....	88,812	.....	88,812
1937.....	.....	.....	.....	125,343	.....	125,343
1938.....	.....	.....	.....	41,590	.....	41,590

Table 276.—Canadian Imports and Exports of Graphite, 1937 and 1938

	1937		1938	
	Quantity	Value	Quantity	Value
	Tons	\$	Tons	\$
IMPORTS—				
Crucibles, plumbago.....	.....	62,433	.....	60,616
Plumbago, not ground or otherwise manufactured.....	.....	9,545	.....	18,546
Plumbago, ground, and manufactures of, n.o.p.....	.....	105,188	.....	69,342
EXPORTS—				
Graphite or plumbago, crude or refined.....	2,948	133,262	1,150	54,366
Carbon and graphite electrodes.....	.....	721,727	.....	614,925

Table 277.—Consumption of Graphite or Plumbago in Canada, by Industries, as Reported to the Census of Industry, 1937 and 1938

Industry	1937		1938	
	Quantity	Cost at works	Quantity	Cost at works
	Short tons	\$	Short tons	\$
Paints and varnishes.....	48	4,112	47	4,057
Polishes.....	54	5,769	46	5,231
Foundries.....	159	19,788	134	15,789
Acids and salts (*).....	58	17,192	75	21,890
Prepared foundry facings.....	157	7,120	177	5,387
Total accounted for.....	476	53,931	479	55,354

(a) Not yet complete.

(*) In addition, electrodes valued at \$301,378 were used in 1937.

Production of graphite in Canada during the first six months of 1939 was valued at \$25,035 compared with \$22,616 in the corresponding period of 1938.

“Mineral Trade Notes” of the United States Department of the Interior reports as follows:—“As a result of increased demand for graphite in the United States, the amorphous graphite industry in the Guaymas consular district of Mexico showed marked improvement for the first quarter of 1939; shipments of amorphous graphite to the United States, the sole market for the output, totalled about 3,012 short tons in the first quarter of 1939. The price for amorphous graphite containing approximately 83 per cent carbon was steady throughout the quarter at about \$10 United States currency per short ton f.o.b. shipping point in Mexico.

“Japan continued to dominate the Ceylon graphite market in the first quarter of 1939, buying about 42 per cent of all graphite exports; the demand for crystalline or flake graphite in Japan shows no signs of declining. Exports of graphite from Ceylon during the first quarter of 1939 totalled 95,483 cwt. valued at 673,588 rupees and of these 41,676 cwt. went to Japan; 29,546 cwt. to the United States; 9,494 cwt. to the United Kingdom; 4,481 cwt. to Germany and 10,286 cwt. to other countries. (\$1 = Rs. 2.86).

“In 1938, a total of 13,433 metric tons of graphite was exported from Madagascar. In the last quarter of 1938 graphite exports totalled 3,229 tons shipped to the following countries:—France 1,287, England 684, United States 548, Belgium 47, Japan 610, Germany 10, Denmark 1, Norway 2, China 10 and Poland 30.”

Table 278.—World Production of Graphite, 1937 and 1938

(Imperial Institute, London)

(Long tons)

Producing Country	1937	1938	Producing Country	1937	1938
BRITISH EMPIRE			FOREIGN COUNTRIES—Con.		
Union of South Africa.....	61	53	Norway (exports).....	3,684	3,781
Canada (sales).....	(b)	(b)	Sweden.....	25	47
Ceylon (exports).....	17,381	11,783	Madagascar—		
India.....	558	458	Flake.....	7,877	10,305
Australia.....	14	10	Powder.....	2,583	4,011
FOREIGN COUNTRIES			Morocco (French).....	331	193
Austria (crude).....	17,871	(a)	Argentina.....	25	(a)
Czechoslovakia.....	5,063	(a)	Mexico.....	11,032	9,459
Germany (crude).....	23,172	(a)	Brazil.....	8	(a)
Italy.....	5,326	5,396	Japan.....	(a)	(a)
			Korea—		
			Flake.....	(c) 5,182	(c) 7,742
			Other.....	(c) 37,698	(c) 41,811

NOTE.—Graphite is also produced in the U.S.S.R. and the United States.

(a) Information not available.

(b) Recorded by value only 1937.....£25,373

1938.....£ 8,440

(c) Exports.

GRINDSTONES AND PULPSTONES

Quarry sales of grindstones and other natural abrasive stones in Canada during 1938 totalled 306 short tons valued at \$16,198 compared with 412 tons at \$21,429 in 1937. The shipments in 1938 included 21 tons of sharpening stones valued at \$3,408 and 285 tons of grindstones worth \$12,790. The stone for the processing of these products was quarried in Nova Scotia and New Brunswick. No production of pulpstones was reported in 1938; in 1937 the Canadian output of these stones totalled 87 short tons valued at \$4,875. The entire production of pulpstones in 1937 originated in a quarry situated on the northeast end of Gabriola Island, near Nanaimo, Vancouver Island, British Columbia.

In 1937 Canadian grindstones were valued at approximately \$50 per ton and pulpstones at \$57 per ton at the quarries. The Bureau of Mines, Ottawa, reported in 1938 that there was a demand for good pulpstones, particularly for use in the large magazine grinders, but as deposits containing thick beds of the proper quality sandstone are very scarce in Canada, only about 1 per cent of the stones used recently in Canadian pulpmills was produced in the Dominion. The artificial pulpstones made of silicon carbide segments and also more recently of fused alumina segments are gradually but surely replacing the natural stone.

Imports of grindstones, etc., into Canada in 1938 were as follows:—Grinding wheels, manufactured by the bonding together of either natural or artificial abrasives, value \$88,851 (\$84,404 from United States); Grinding stones or blocks, manufactured by the bonding together of either natural or artificial abrasives, value \$21,257 (\$20,848 from United States); Grindstones not mounted and not less than 36 inches in diameter number 840 value \$91,205 (189 at \$6,366 from United Kingdom and 650 at \$84,375 from United States); Grindstones n.o.p. number 4,516 valued at \$6,161.

Exports of manufactured grindstones from Canada in 1938 were valued at \$5,441.

Table 279.—Production of Grindstones, Pulpstones and Scythestones in Canada, 1929-1938

Year	Tons	\$
1929.....	1,947	106,354
1930.....	830	62,021
1931.....	621	38,103
1932.....	328	15,735
1933.....	498	21,919
1934.....	987	46,478
1935.....	708	34,010
1936.....	569	24,724
1937.....	412	21,429
1938.....	306	16,198

Table 280.—Production of Natural Abrasive Stones, by Kinds, 1938

	Pulpstones		Sharpening Stones		Grindstones	
	Tons	\$	Tons	\$	Tons	\$
Nova Scotia.....			16	2,688	115	4,318
New Brunswick.....			5	720	170	8,472
British Columbia.....						
Canada.....			21	3,408	285	12,790

Table 281.—Consumption of Pulpstones by the Canadian Pulp and Paper Industry, 1931-1938

Year	Number for 2 ft. wood	Value	Number for 2-5 ft. wood	Value	Number for 4 ft. wood	Value
		\$		\$		\$
1931.....	226	72,588	225	71,760	285	337,580
1932.....	210	65,450	139	46,436	222	249,373
1933.....	321	98,475	95	31,945	199	223,635
1934.....	378	103,811	84	29,680	268	292,359
1935.....	417	116,501	52	20,297	237	243,805
1936.....	463	120,227	61	19,478	253	281,265
1937.....	392	123,598	84	21,700	280	382,084
1938.....	306	92,822	37	13,351	186	238,488

The Artificial Abrasives and Abrasive Products Industry

The factory selling value of all products made during 1938 by the manufacturers in Canada of artificial abrasives and abrasive products amounted to \$9,579,705. This value represented a decline of 32 per cent from the total of \$14,174,351 in 1937 and 10 per cent from the 1936 output of \$10,631,533.

Sixteen establishments made artificial abrasives and abrasive products in 1938, fourteen being in Ontario and two in Quebec. The average number of employees was 1,141 and payments in salaries and wages totalled \$1,602,771. Expenditures for manufacturing materials amounted to \$2,657,393, and \$830,813 was paid out for fuel and electricity. Capital investment in the industry totalled \$6,754,670, of which \$3,368,646 was for land and buildings.

Artificial abrasives were made by 4 plants in Ontario and 2 in Quebec. The output of these 6 works was valued at \$7,836,135 and included 50,515 tons of crude fused alumina at \$5,165,920; 19,094 tons of crude silicon carbide at \$2,002,041 and other products and by-products such as ferrosilicon, firesand, refractory brick, refractory cements, calcium boride, crude boron carbide and boron carbide shapes. An average of 834 people were employed and salaries and wages totalled \$1,163,391.

Ten other plants were occupied chiefly in making abrasive products such as wheels, paper, pulpstones and sharpening stones; 9 made abrasive wheels and segments, 7 made sharpening stones and files, and 2 made abrasive cloth and paper. The value of all products made in these establishments was \$1,743,570. The number of employees was 307 and payments for salaries and wages amounted to \$439,380.

Exports of crude artificial abrasives totalled 60,111 tons valued at \$3,773,570 in 1938, and the exports of wheels and stones were reported at \$79,923.

Imports of crushed or ground artificial grains were appraised at \$418,462 and manufactured grinding wheels at \$88,851 in 1938.

Table 282.—Products Manufactured, 1937 and 1938

Product	1937		1938	
	Short tons	Selling value at works	Short tons	Selling value at works
		\$		\$
Crude silicon carbide.....	25,644	2,808,016	19,094	2,002,041
Crude fused alumina.....	86,604	8,435,371	50,515	5,165,920
Silicon carbide firesand, etc.....	703	11,192	321	5,147
Abrasive wheels and segments.....		1,165,400		916,685
Sharpening stones and files.....		95,317		81,467
Ferrosilicon.....	7,396	94,824	6,819	79,369
Other products (*).....		1,564,225		1,319,066
Total.....		14,174,351		9,579,705

(*) Includes abrasive cloth, abrasive paper, tiles, artificial pulpstones, artificial graphite, boron carbide, boron carbide shapes, calcium boride, fused magnesia, refractory cements, firebrick, etc., each of which was reported by only one or two companies.

Table 283.—Materials Used in Manufacturing Artificial Abrasives, 1937 and 1938

Material	Unit of measure	1937		1938	
		Quantity	Cost at works	Quantity	Cost at works
			\$		\$
Bauxite and pure alumina.....	short ton	102,843	2,200,551	57,120	1,267,712
Coal (not for fuel)—					
For fused alumina.....	short ton	1,140	5,928	308	1,603
For silicon carbide.....	short ton	6,416	38,519	5,855	35,241
Coke (not for fuel)—					
For fused alumina.....	short ton	5,910	30,416	3,723	20,391
For silicon carbide.....	short ton	25,784	345,241	17,647	230,963
Electrodes.....	short ton	1,580	203,155	929	111,746
Feldspar.....	short ton	53	1,503	41	1,129
Iron borings.....	short ton	10,025	107,527	5,651	51,155
Salt.....	short ton	338	2,786	203	1,784
Sawdust.....	short ton	9,277	26,431	7,132	19,242
Silica sand.....	short ton	45,240	211,899	32,746	159,284
Artificial abrasive grains.....	short ton	2,364	406,479	2,534	281,475
Natural abrasive grains—					
Garnet.....	lb.	327,139	28,951	195,536	17,219
Emery.....	lb.		(a)	66,191	3,807
Quartz or flint.....	lb.		(a)	405,282	4,937
Other.....	lb.	399,235	12,956	22,195	2,805
Bonding and bushing materials—					
Clay bonds.....	lb.	739,025	22,511	436,380	13,015
Silicate.....	lb.		(a)	8,781	3,340
Elastic mixture.....	lb.	51,760	9,846	15,150	3,654
Bakelite and synthetic resins.....	lb.	107,544	37,926	108,591	37,426
Lead for bushings.....	lb.	70,648	4,655	35,150	1,814
Cotton cloth.....			103,599		71,390
Kraft and rope paper.....			119,223		61,543
Containers and packing material.....			46,063		29,555
All other materials.....			385,389		228,163
Total.....			4,351,854		2,657,393

(a) Not separately stated in 1937.

Table 284.—Imports Into Canada and Exports of Abrasives, 1937 and 1938

	1937		1938	
	Quantity	Value	Quantity	Value
		\$		\$
IMPORTS				
Artificial abrasive grains, crushed or ground for use in Canadian manufactures.....		699,020		418,462
Diamond dust or bort and black diamond for borers.....		4,630,037		3,950,698
Diatomaceous earth or infusorial earth (Kieselguhr), ground or unground.....	Cwt.	43,940	63,917	73,900
Emery in bulk, crushed or ground.....		60,030	51,299	38,743
Grinding wheels, manufactured by the bonding together of either natural or artificial abrasives.....		106,232		88,851
Grinding stones or blocks, manufactured by the bonding together of either natural or artificial abrasives.....		16,353		21,257
Manufactures of emery or of artificial abrasives, not otherwise provided for.....		62,864		42,345
Grindstones, not mounted, and not less than 36 inches in diameter.....	1,587	157,099	840	91,205
Grindstones, not otherwise provided for.....	No. 7,133	11,306	4,516	6,161
Pumice and pumice stone, lava and calcareous tufa, not further manufactured than ground.....		26,238		24,688
Sandpaper, glass, flint and emery paper and emery cloth.....		80,521		60,560
Total.....		5,914,217		4,816,870
EXPORTS				
Abrasives, natural, n.o.p., in ore or bulk, crushed or ground, including infusorial earth, rotten stone, tripoli, etc.....	Cwt.	8,422	13,153	11,346
Abrasives, artificial, crude, including carborundum.....	Cwt.	2,258,435	6,544,454	3,773,570
Abrasives, artificial, made up into wheels, stones, etc. (To March 31, 1938).....		141,214		47,704
Abrasives, artificial, made up into wheels and stones (From April 1, 1938).....				32,219
Sandpaper, glass, flint and emery paper, and emery cloth (From April 1, 1938).....				79,600
Grindstones, manufactured.....		135		5,441
Total.....		6,698,956		3,949,880

KYANITE

The following information is from a recent bulletin of the "Imperial Institute", London (Vol. XXXVI—No. 4). Kyanite, a natural silicate of alumina (Al_2SiO_5 or $\text{Al}_2\text{O}_3 \cdot \text{SiO}_2$) is finding a steadily growing market for the preparation of refractories. It is not used in the raw state, but is first fired at $1,450^\circ$ to $1,500^\circ \text{C.}$, and then ground ready to mix with the bond. The product of calcination, however, is known in the trade as "Sillimanite", a misnomer which often leads to confusion. Sillimanite and andalusite are other natural minerals of exactly the same chemical composition as Kyanite (but different in physical properties), and both are likewise converted on heating into mullite and silica. The conversion of andalusite into mullite is not accompanied by any change in volume and this mineral can therefore be used in the raw state as a refractory. Mullite made from Kyanite is used in the construction of numerous types of furnaces, including electric furnaces and those for the enamelling and glass industries. When added to ceramic compositions containing clay and Kaolin, it is claimed to reduce shrinkage, lower the coefficient of expansion, increase breaking strength, resistance to abrasion and electrical resistance, and extend the sintering range. It is also a constituent of certain sparking-plug porcelains.

Kyanite is usually a rock-forming mineral, and only rarely does it occur in large monomineralic masses as segregations in quartz-kyanite gneiss or schist. Indian kyanite is the most popular at the present time. The production in India commenced in 1924 and amounted to 24,787 tons in 1936. The mineral also occurs in Nyasaland, British East Africa and Western Australia.

The leading andalusite mine in the world is operated by Champion Sillimanite, Inc., in the White Mountains, California; this company is a subsidiary of the Champion Spark Plug Co., Detroit, Mich. Imports of kyanite and sillimanite into the United States in 1938 totalled 3,964 short tons valued at \$32,458 compared with 7,674 short tons at \$79,410 in 1937.

None of the minerals, kyanite, sillimanite or andalusite are commercially mined in Canada at the present time and any imports of these minerals into Canada are not shown separately in the Canadian Customs classification. "Metal and mineral markets"—New York, October 1939 quoted kyanite—per ton f.o.b. North Carolina and Georgia \$17.50 to \$25 nominal.

LITHIUM MINERALS

Commercial production of Canadian lithium minerals were first recorded in 1937. These were made by the Lithium Corporation of Canada, Limited, from deposits located at Bernic Lake, near Pointe du Bois, Eastern Manitoba. The material was valued at \$1,694 and was consigned to a United States chemical plant. The Bureau of Mines, Ottawa, reports that the present supply of lithium minerals is drawn from deposits in the United States, Southwest Africa, and France. The newly discovered spodumene deposits in North Carolina are regarded as one of the world's largest potential sources of supply of lithium. The principal commercial lithium ores are amblygonite, a fluophosphate of lithium and aluminium; spodumene, a silicate of these two elements; and lepidolite or lithia mica, also a silicate. All of the above minerals occur in Canada, but there has, as yet, been only a small production, mainly of lepidolite and spodumene, the important deposits are all in Manitoba. No commercial mine shipments of lithium minerals were reported in Canada during 1938.

South West Africa and France are the largest producers of lithium ores outside the United States. In 1938 the total production of lithium compounds in the United States as given by producers to the United States Bureau of Mines, aggregated 892 short tons valued at \$329,088.

Spodumene expands in whiteware bodies, and if properly controlled this expansion may offset shrinkage and other production troubles in ceramic work. Lepidolite hardens and toughens clear glass and lowers the expansion coefficient.

"Metal and Mineral Markets" New York quoted lepidolite (Oct. 1939), per ton, \$20 to \$25 for ordinary grades, lump, f.o.b. mines. Amblygonite—per ton f.o.b. mines 8 to 9 per cent Li_2O \$40. Spodumene—per unit Li_2O contained \$5 on 6 per cent grade carload lots, North Carolina.

Statistics relating to possible imports of lithium minerals or chemicals into Canada are not shown separately in the Canadian Customs classification.

MAGNESITIC-DOLOMITE

Production of magnesitic-dolomite (sales and producers consumption of calcined and dead burned) in Canada during 1938 was valued at \$420,261.

Magnesitic dolomite, an intimate mixture of magnesite and dolomite is quarried and processed at Kilmar and Harrington East, in Argenteuil county, Quebec. It is marketed in the caustic and dead-burned states; in the form of bricks; as finely ground refractory cement; and also in combination with chrome as an ingredient in certain types of refractories. Caustic-calcined magnesia is used for fettling the bottoms of basic open hearth furnaces and for the construction of floors and floor tiles. The deposits of magnesitic dolomite in Argenteuil county, Quebec, are ample to supply magnesia products for domestic requirements for many years, and also to support a large export trade. An interesting development during the year was the discovery by one of the officers of the Federal Bureau of Mines, at Rutherglen, Ontario, and at Bryson, Quebec, of brucite-bearing limestone. Brucite a hydrated magnesium oxide contains a higher percentage of magnesium than magnesite and can be utilized for the manufacture of refractory material for lining metallurgical furnaces. It has value also as a potential source of magnesium metal. The mineral also occurs at Farm Point in the Gatineau River Valley, Quebec.

Large deposits of hydromagnesite are reported to occur near Atlin and at other localities in British Columbia

The United States Bureau of Mines reported on brucite in its 1939 minerals Year Book as follows: "After sundry set-backs, brucite mining has just become established on a moderately extensive scale. The deposits near Luning, Nevada, are of enormous extent and high purity. Small quantities of this natural hydrate of magnesia $Mg(OH)_2$, have been employed in petroleum refineries and for making magnesium compounds but the important outlet at present is in the manufacture of furnace refractories, largely to increase the slag resistance of dolomite".

Table 285.—Production of Magnesitic-Dolomite (Calcined) in Canada, 1929-1938

Year	Tons	Value
		\$
1929.....	18,809	491,170
1930.....	13,336	336,162
1931.....	11,411	295,579
1932.....	(a)	262,860
1933.....	(a)	360,128
1934.....	(a)	382,927
1935.....	(a)	486,084
1936.....	(a)	768,742
1937.....	(a)	677,207
1938.....	(a)	420,261

† Represents value of magnesite (dead-burned, etc.) only, whereas the values for years immediately preceding include the value of some end products containing imported material; for this reason the 1938 value is not entirely comparable with those for recent years.

(a) Not published.

Table 286.—Magnesite and Dolomite Used in the Canadian Primary Iron and Steel Industry, 1931-1938

	Dolomite		Magnesite	
	Short tons	Value	Short tons	Value
		\$		\$
1931.....	15,773	76,317	(a)	(a)
1932.....	6,725	32,523	420	14,500
1933.....	6,874	30,557	399	14,798
1934.....	14,748	69,104	2,733	105,072
1935.....	13,394	79,914	3,891	149,987
1936.....	43,562	145,502	6,432	230,656
1937.....	53,066	181,146	8,994	326,091
1938.....	40,540	137,127	9,219	336,811

(a) Information not available.

Relatively large quantities of magnesite or magnesium refractories are also used in the smelting of non-ferrous ores but complete data relating to this consumption are not yet available.

Table 287.—Calcined Magnesite Used by the Artificial Abrasives and Abrasive Products Industry in Canada, 1933-1938

Year	Tons	Value	Year	Tons	Value
		\$			\$
1933.....	(a)	16,430	1936.....	418	25,256
1934.....	104	6,370	1937.....	484	29,242
1935.....	40	2,448	1938.....		

(a) Information not available.

Table 288.—Imports and Exports of Magnesite and Products, 1937 and 1938

	1937		1938	
	Quantity	Value	Quantity	Value
	Tons	\$	Tons	\$
IMPORTS—				
Magnesia pipe covering.....		63,546		34,601
Magnesite (crude rock).....	0.5	64	0.05	4
Magnesite firebrick.....		653,507		571,910
Magnesite, dead-burned, sintered, caustic-calcined or plastic magnesite.....	1,019	55,360	698	43,956
Magnesium carbonate excepting crude rock and that used for rubber manufacture.....	487	48,002	382	35,575
Magnesia (magnesium oxide).....	135	30,868	70	17,108
Magnesite calcined, for the manufacture of insulating materials (a).....	411	15,407	299	9,507
EXPORTS—				
Magnesite, calcined or dead-burned.....	2,028	49,401	3,971	95,607

(a) This item recorded only from April 1937.

“Metal and Mineral Markets” New York, October, 1939 quotations for magnesite were:—per ton f.o.b. California, dead burned, \$25. Artificial periclase, 94 per cent, MgO, \$65; 90 per cent \$35. Caustic 95 per cent MgO, white color, \$40; 85 per cent MgO, no colour standard \$37.50. Washington: Dead-burned grain magnesite, \$22.

The 21st annual report of the National Research Council of Canada for the fiscal year 1937-1938 refers to metallic magnesium as follows:—“During the year under review research has been initiated on production of metallic magnesium. Being the lightest metal (its specific gravity 1.74, may be compared with that of aluminium 2.71) which is reasonably stable under atmospheric conditions, its use is expanding rapidly in aircraft construction. Canada possesses abundant supplies of magnesium-bearing minerals, and with cheap electric power, this country should be in a position to enter the field when demand increases. Research has been undertaken to examine the Canadian raw materials and to develop suitable methods for winning the metal therefrom. . . . experiments are under way on various methods for producing the oxide in reasonably pure form from magnesite, dolomite-magnesite, and serpentine, extensive deposits of all of which occur in Canada. . . . Up to the present practically all the commercial metallic magnesium has been produced by electrolysis of the fused chloride. Electrothermic reduction with carbon or other suitable reducing agent is very attractive and future developments are likely to be on these lines. . . .”

Table 289.—World Production of Magnesite, 1937-1938

(Imperial Institute, London)

(Long tons)

Producing Country and Description	1937	1938	Producing Country and Description	1937	1938
BRITISH EMPIRE			FOREIGN COUNTRIES—Con.		
Union of South Africa—Crude....	1,724	2,574	Greece—		
Canada—Crude.....	(d)	(d)	Crude.....	159,123	(a)
India—Crude.....	26,166	26,611	Caustic (c).....	44,548	(a)
Australia—Crude.....	19,705	19,516	Dead-burnt (c).....	5,404	(a)
FOREIGN COUNTRIES			Italy—		
Austria—			Crude.....	5,307	6,060
Crude.....	451,980	(a)	Calcined (c).....		650
Caustic (c).....	(a)	(a)	Norway—		
Dead-burnt (c).....	(a)	(a)	Crude.....	2,063	(a)
Bricks (c).....	(a)	(a)	Calcined (c).....	801	(a)
Czechoslovakia—			Bricks (c).....	587	(a)
Crude (b).....	12,010	12,789	Yugoslavia (Serbia only)—		
Calcined (b).....	37,465	28,923	Crude.....	40,531	38,693
Bricks (b).....	3,256	902	Calcined.....	19,464	15,146
Germany (Prussia)—			United States—		
Crude.....	20,758	(a)	Crude.....	181,640	86,600
			Caustic (sales) (c).....	8,956	6,607
			Dead-burnt (sales) (c).....	74,289	34,588
			Korea—Crude.....	(e) 14,188	(e) 15,820
			Manchuria—Crude.....	(e) 163,797	(e) 168,996
			Turkey—Crude.....	316	850

(a) Information not available.

(b) Exports less imports.

(c) Derived from crude shown, and *not* additional.

(d) Production recorded by value only:—1936.....£154,583 1937.....£137,086 1938.....£85,280

(e) Exports.

For 1937 the values represent the calcined magnesite sold plus the value of manufactured products, whereas the 1938 figure represents the value of the calcined magnesite sold plus the value of the magnesite used for further manufacture.

Magnesite is also produced in the U.S.S.R.

MAGNESIUM SULPHATE (EPSOM SALTS—NATURAL)

Production (sales) of natural magnesium sulphate or crude Epsom salts in Canada during 1938 totalled 470 short tons valued at \$9,400 compared with 727 short tons at \$14,456 in 1937. Output in both years came from a deposit of the mineral occurring at Basque, British Columbia. The crude material obtained from the Basque deposits is refined in a plant at Ashcroft, British Columbia, by the Ashcroft Epsom Salts Co. Ltd., successor to Epsom Refineries Ltd. The output of the Ashcroft plant has been marketed chiefly in the tanning and medicinal industries.

In 1918 crude magnesium sulphate was mined at Spotted Lake in the Osoyoos division, British Columbia, the crude material was refined at Oroville, Wash., U.S.A.; shipments in 1916 were reported at 250 tons and in 1915 about 300 tons; the same operator also made shipments during 1918 from a deposit near Clinton, in Lillooet, British Columbia.

Table 290.—Production of Natural Magnesium Sulphate in Canada*, 1934-1938

Year	Tons	Value
		\$
1934.....	42	1,100
1935.....	340	7,965
1936.....	654	13,712
1937.....	727	14,456
1938.....	470	9,400
Grand Total.....	11,087	188,307

(*) Produced entirely in British Columbia.

Table 291.—Magnesium Sulphate Used in Canadian Pharmaceutical Preparations and Tanning, 1934-1938

Year	Pharmaceutical preparations		Tanning(*)	
	Pounds	Value	Pounds	Value
		\$		\$
1934.....	816,830	33,793	228,281	4,789
1935.....	826,082	22,647	759,744	12,254
1936.....	878,120	23,162	1,115,965	15,120
1937.....	919,825	23,881	992,203	16,165
1938.....	855,547	23,687	1,272,549	14,153

(*) Data not entirely complete for 1934.

Table 292.—Imports Into Canada of Magnesium Sulphate (Epsom Salts), 1931-1938

Year	Pounds	\$	Year	Pounds	\$
1931.....	4,120,086	43,807	1935.....	3,684,390	40,407
1932.....	4,383,115	47,679	1936.....	3,579,069	37,928
1933.....	4,269,852	49,868	1937.....	(*)3,355,147	33,116
1934.....	4,599,518	48,459	1938.....	(a)3,606,167	33,018

(*) 2,553,069 pounds valued at \$17,030 from Germany and 693,204 pounds at \$14,058 from United States.

(a) 2,883,622 pounds valued at \$18,659 from Germany and 604,205 pounds valued at \$12,312 from the United States.

Canadian trade publications quoted (September, 1939) magnesium sulphate, B.P. bbls. 2½ to 3 cents per pound. Technical, bags, \$35 to \$40 per ton.

MINERAL WATERS

Shipments of natural mineral waters from Canadian springs totalled 188,309 imperial gallons valued at \$21,619 in 1938 compared with 225,019 imperial gallons worth \$20,586 in the preceding year. Production during both years originated in Ontario and Quebec. Some of the more prominent Canadian mineral waters possessing special therapeutic or hygienic properties include the following: in Quebec, the Abenakis springs on the St. François river in Yamaska county; Potton Springs in Brome county and the Coulombia spring at L'Epiphanie. In Ontario, saline, sulphur and gas springs occur at Caledonia Springs and at Carlsbad Springs, near Ottawa; the waters range from alkaline to strongly saline. St. Catharines, near Niagara, is one of the oldest Canadian mineral water resorts and sulphur waters are found at the Preston mineral springs in Waterloo county. The most famous of all Canadian springs is undoubtedly the group of hot sulphur springs at Banff, Alberta. In British Columbia the Harrison Hot Springs in the Fraser Valley and the Halcyon Hot Springs on Arrow Lake are noted for their curative properties.

The total number of firms reporting production of natural mineral waters in the Dominion totalled 14 in 1938, of which 11 were located in the province of Quebec and 3 in Ontario.

It is interesting to note that natural mineral waters from springs in the county of Lac St. Jean, Quebec, were utilized during both 1936 and 1937 in highway maintenance.

Table 293.—Shipments of Natural Mineral Waters from Canadian Springs, 1934-1938

	Quebec		Ontario		Canada	
	Imp. gal.	\$	Imp. gal.	\$	Imp. gal.	\$
1934.....	75,665	16,116	21,775	1,622	97,440	17,738
1935.....	126,616	15,113	19,900	1,477	146,516	16,590
1936.....	131,186	17,399	23,100	1,117	154,286	18,516
1937.....	198,319	19,697	26,700	889	225,019	20,586
1938.....	159,893	19,033	28,416	2,586	188,309	21,619

Shipments of natural mineral waters from Canadian springs during the first six months of 1939 totalled 54,684 imperial gallons valued at \$9,321 compared with 49,391 gallons at \$6,442 in the corresponding period of 1938.

Imports into Canada of natural mineral waters, not in bottles, totalled 90 imperial gallons valued at \$20 in 1938 compared with 60 gallons worth \$37 in 1937. Mineral and aerated waters, n.o.p., imported during 1938 were valued at \$61,928 against \$88,607 in the preceding year.

Exports of mineral and aerated waters during 1938 were valued at \$6,177 while in 1937 similar exports amounted to \$5,097.

Table 294.—Sales of Natural Mineral Waters* by the Canadian Aerated Waters Industry, 1930-1938

Years	\$	Years	\$
1930.....	178,348	1935.....	45,100
1931.....	140,730	1936.....	63,687
1932.....	92,066	1937.....	102,648
1933.....	77,125	1938.....	105,872
1934.....	52,113		

(*) Whether fortified or not.

PHOSPHATE

Production of phosphate in 1938 amounted to only 208 tons valued at \$1,886. The mineral during the year under review was obtained entirely from deposits located in the Hull-Buckingham district of the province of Quebec and was utilized in the manufacture of chemicals. The mineral as produced in Canada usually represents a by-product in the mining of mica.

The Department of Mines and Resources, Ottawa, reports that the only important recorded occurrences of phosphate rock in Canada are the Precambrian apatite deposits of the Ottawa-Kingston region in Ontario and Quebec, and the rather low-grade sedimentary phosphate of the Crowneest district just west of the boundary between southern Alberta and British Columbia.

The Quebec and Ontario apatite deposits were once of considerable importance and were actively mined as a source of fertilizer phosphate, but the industry became unprofitable upon the discovery of the immense sedimentary phosphate deposits of the Southern United States about 1890. Enormous tonnages of apatite are now being produced by concentration from low-grade ores of the Murmansk region in Russia.

Although fertilizers will always continue to consume the great bulk of the world's phosphate produced, a growing future for phosphorous and its compounds appears to be assured. One of such chemicals that is rapidly coming into extensive use is tri-sodium phosphate, employed as a detergent in laundry work and as a general cleanser, as well as for preventing scale or scum in boiler-feed and washing waters, and in the tanning, photographic, sugar, and other industries.

The largest annual output of phosphate to be recorded in Canada was for 1890 in which year production was reported at 31,753 tons valued at \$361,045. The total production of the mineral in the Dominion from 1870 to the end of 1938 totalled 342,185 short tons valued at \$4,656,336.

Table 295.—Production of Phosphate in Canada, 1929-1938

Year	Short tons	\$	Year	Short tons	\$
1929.....	1,185	5,380	1934.....	81	683
1930.....	40	760	1935.....	186	1,103
1931.....			1936.....	525	4,927
1932.....	1,316	12,333	1937.....	100	900
1933.....	2,214	5,475	1938.....	208	1,886

Table 296.—Imports of Phosphate and Phosphate Products, 1936-1938

	1936		1937		1938	
	Quantity	Value	Quantity	Value	Quantity	Value
	Tons	\$	Tons	\$	Tons	\$
IMPORTS—						
Phosphate rock.....	83,474	298,179	113,970	453,599	128,409	455,697
Acid phosphate (not medicinal).....	219	28,462	202	23,186	422	48,070
Phosphorus and compounds, n.o.p.....	35	22,762	46	28,370	68	39,804
Superphosphate or acid phosphate of lime	96,067	867,666	100,726	952,775	114,356	1,092,859

In addition there are considerable quantities of soda phosphate imported; also in 1938 phosphoric acid imports totalled 319,999 pounds valued at \$15,898.

According to the United States Bureau of Mines the Montana Phosphate Products Co., Trail, British Columbia, operated the Anderson mine near Garrison, Montana and United States Government leases in 1938, supplying the requirements of the Consolidated Mining and Smelting Co. of Canada Ltd. at Trail. The Trail plant treats the phosphate rock with sulphuric acid, producing "triple (or treble)" superphosphate. The plant at Trail also makes ammonium phosphate and mixtures of ammonium phosphate and ammonium sulphate.

Table 297.—Phosphate Rock and Superphosphate Used in the Manufacture of Canadian Fertilizers, 1931-1938

Year	Superphosphate		Phosphate Rock	
	Short tons	\$	Short tons	\$
1931.....	51,639	595,789	48,373	395,547
1932.....	36,005	366,462	41,114	316,518
1933.....	59,443	657,123	21,961	164,614
1934.....	73,182	839,980	48,007	396,133
1935.....	86,701	986,674	74,507	610,118
1936.....	97,515	1,103,222	60,924	438,948
1937.....	137,801	1,661,243	101,704	726,572
1938.....	168,519	2,047,206	102,125	765,816

"Metal and Mineral Markets"—New York—October, 1939—phosphate quotations—were—per long ton, f.o.b. mines: Florida pebble, domestic: 77 to 76 per cent, \$3.65; 75 per cent, \$2.90. Tennessee, ground lime phosphate, 85 per cent, through 300 mesh, 34.30 per cent P_2O_5 , \$7.00 per short ton, bags extra.

Table 298.—World Production of Phosphate Rock, 1937 and 1938

(Imperial Institute, London)
(Long tons)

Producing Country	1937	1938	Estimated Tribasic Phosphate of Lime Content or equivalent	
			1937	1938
BRITISH EMPIRE				
Tanganyika.....	102	104	(a)	(a)
Seychelles (exports).....	9,442	21,360	(a)	(a)
Canada.....	89	186	74	154
India.....	166	23	134	15
Christmas Island.....	162,568	159,859	138,500	136,200
Australia.....	16	(a)	11	(a)
Nauru Island.....	688,900	841,050	586,300	643,400
Ocean Island.....	398,800	299,550	353,300	229,200
Total.....	1,260,000	1,322,000		
FOREIGN COUNTRIES				
Belgium (b).....		(a)		(a)
Estonia.....	9,952	12,806	4,349	5,596
France.....	101,747	(a)	66,000	(a)
Germany.....	3,262	(a)	1,780	(a)
Italy.....	197		(a)	
Poland.....	(a)	(a)	(a)	(a)
Roumania (d).....	935	(a)	(a)	(a)
Sweden.....	4,839	6,094	3,880	4,447
U.S.S.R.....	(a)	(a)	(a)	(a)
Algeria.....	621,180	575,221	395,000	366,000
Egypt.....	508,837	451,164	346,000	296,000
Madagascar.....	4,222	5,602	3,200	4,150
Morocco (French).....	1,455,156	1,464,021	1,030,000	1,126,000
Tunis.....	1,757,100	1,906,300	1,050,000	1,170,000
Netherlands West Indies.....	96,288	97,715	83,100	84,300
United States.....	4,261,416	3,860,476	3,072,000	2,783,000
Formosa.....	(a)	(a)	(a)	(a)
French Indo-China.....	19,932	36,751	16,100	29,700
China (estimated).....	8,000	8,000	6,500	6,500
Japan.....	(a)	(a)	(a)	(a)
Netherlands East Indies.....	25,754	32,590	17,300	21,800
Philippine Islands.....	738	(a)	600	(a)
Angaur Island (exports).....	89,220	103,910	71,400	83,200
French Oceania.....	160,000	111,000	134,000	96,000
New Caledonia.....	302	1,730		
Total.....	(a)	(a)		
World's Total.....	(a)	(a)		

(a) Information not available.

(b) In addition phosphatic chalk was produced as follows:—

1936..... 58,737 long tons

1937..... 51,444 "

(d) Phosphatic guano, converted from cubic metres at the rate of 1 cubic metre=2 long tons.

POTASH

In the Southwestern part of Kyuquot sound, on the west coast of Vancouver Island, British Columbia, the metamorphic volcanic rocks have been peculiarly altered to rocks containing large amounts of alunite ($K_2O \ 3 \ Al_2O_3 \ 4 \ SO_3 \ 6 \ H_2O$). Alunite has attracted considerable attention as a possible source of "potash" as well as a source of alum. Production from the British Columbia deposits amounted to 30 tons of calcined alunite in 1921. Small shipments were also made during 1922, 1923 and 1925. The preparation of natro-alunite for the market consisted in crushing, grinding and roasting; the resultant product, calcined alunite, may be used as a fertilizer because of the potash content.

Natural potash salts are not yet mined or recovered on an extensive commercial scale in Canada. Potash occurs in small quantities in rock salt strata at Malagash, Cumberland County, Nova Scotia, and at Gautreau, Westmorland County, New Brunswick. Potassium chloride occurs at Malagash in a number of definite bands in the salt mass in the form of crystalline beds of pink and yellowish green sylvite in the matrix of halite. The 1938 annual report of the Department of Public Works and Mines, Nova Scotia, refers to the Malagash occurrence as follows:—"There are two white seams of salt roughly parallel to each other called the Lucas and the McKay and which are being operated by the company. Approximately midway between these two seams a new zone was found in the upper levels carrying potash. This zone was not wide enough to be of commercial value but recent drilling from one seam to the other on the bottom levels has shown a considerable increase in the width of this potash zone and an increase in the potash content".

Considerable potash, in the form of pot ashes and pearl ashes, was produced during the clearing and settlement of arable and other areas in Eastern Canada. These potassium bearing products represented wood ashes obtained from the burning of hardwoods. The greater part of the production was carried on by individual pioneer settlers utilizing hardwood cut in the process of clearing their farms but there were also factories engaged exclusively in the production of pot and pearl ashes. The census of upper and lower Canada (Quebec and Ontario) conducted in 1851-2 established the fact that there were 84 potash plants in upper Canada, 10 of which were located in the county of York; in lower Canada 16 factories for making potash were recorded by the same census survey.

The census of 1860-1 showed 94 factories for the production of pot and pearl ashes in lower Canada (Quebec); 58 of these reported an annual production of 5,742 barrels valued at \$113,135 and of this output 1,050 barrels valued at \$26,550 came from Richmond county, 2,625 barrels at \$27,503 from Wolfe county and 718 barrels worth \$18,810 from Shefford county. The same census recorded 73 plants in upper Canada (Ontario) of which 48 reported a production of 3,472 barrels valued at \$96,405; some of the larger potash producing counties included Stormont, Frontenac, Grenville, Northumberland and Prescott. Exports of pot ashes from Canada (upper and lower) in 1862 totalled 29,759 barrels valued at \$985,801 of which those valued at \$835,854 went to Great Britain and \$149,214 to the United States. In the same year the exports of pearl ashes from Canada totalled 8,098 barrels valued at \$250,610 of which those valued at \$208,524 were shipped to Great Britain and \$42,086 to the United States.

More than 15,000,000 tons of crude potash salts averaging around 13.8 per cent K_2O were mined by German producers in 1938, the greatest mine output ever recorded in the history of the industry. From 85 to 90 per cent is processed to produce muriate, sulfate, and other of the high-grade salts to which the market has shifted. Under Government pressure to increase crop production and measures to cheapen the cost of fertilizers, consumption of potash by German farmers has expanded rapidly in recent years.

Output of crude salts from the French (Alsace) mines established a new record of 3,375,000 tons in 1938. According to the U.S. Bureau of Mines, sales were greater than ever before, but because of the increased home demand producers were unable to supply their full quota established by the International Cartel.

In the United States a senate investigation of the potash industry was started in 1936. It was instituted to determine whether unfair or illegal practices were being employed in the exploitation of potash resources and the extent of foreign ownership or control of American

potash companies. The American Potash Institute reports that deliveries by member companies in the United States and its possessions in 1938 totalled 439,561 tons of potash and that 40,843 tons were exported.

The Potash Association, Inc., organized by American Potash & Chemical Corporation, United States Potash Co., and Potash Company of America, to handle their export sales, filed a statement in December (1938) with the United States Federal Trade Commission, under the Webb-Pomerene Export Act of 1918, setting forth its place of business, officers, etc., and declaring its purpose to engage in exporting potash salts. This act exempts from antitrust laws associations entered into for the sole purpose of engaging in export trade "Provided such association, agreement, or act is not in restraint of trade within the United States, and is not in restraint of the export trade of any domestic competitor of such association."

According to a report by the United States Vice-Consul at Barcelona a decree was issued in November 1938 by the Ministry of Finance and economy creating a Government (Loyalist) monopoly of the Spanish potash industry extending "to the 47 provinces of the Peninsula, Balearic Islands, Canary Islands and territories of the Protectorate in North Africa". The decree provides for the management to be entrusted to the office of potash sales. This office assumes charge of the production and has the power to authorize the producing companies to sign contracts for the sale of monopolized products, provided it concerns transactions in the national market and such transactions are considered suitable in the opinion of the said office.

Table 299.—Potash Salts Used in the Manufacture of Canadian Fertilizers, 1937 and 1938

	1937		1938	
	Tons	Cost at works	Tons	Cost at works
		\$		\$
Kainite and potash manure salts.....	75	2,500	75	2,500
Muriate of potash.....	28,899	795,733	37,174	1,068,820
Sulphate of potash.....	3,925	142,312	5,866	220,512
Nitrate of potash.....	624	32,421	637	33,426

Table 300.—Sales of Potash Salts for Fertilizer Purposes, Other than for Manufacture of Mixed Fertilizers, Years ended June 30, 1937 and 1938

	1937	1938
	Tons	Tons
Muriate of potash.....	8,713	9,449
Sulphate of potash.....	476	700

Table 301.—Imports Into Canada of Specified Potassium Compounds, 1937 and 1938

	1937		1938	
	Pounds	\$	Pounds	\$
Potash compounds, other.....	489,020	74,115	391,521	75,158
Kainite, or German potash salts and mineral.....	1,253,100	12,468	240,400	3,850
Cream of tartar (crystals).....	730,579	104,333	641,344	109,407
Potash and pearl ash.....	184,777	10,919	195,042	10,591
Potash, caustic.....	804,702	51,493	782,956	47,526
Potash, chlorate of.....	1,114,096	50,951	1,133,844	48,404
Saltpetre or nitrate of potash.....	2,512,739	75,811	2,310,365	73,030
Muriate of potash (fertilizer).....	83,890,700	1,027,406	196,779,500	1,108,897
Potash, sulphate of, crude (fertilizer).....	11,002,500	155,390	12,198,600	173,859
Potash, bichromate, crude.....	136,454	11,603	121,531	10,435

† 36,030,300 lb. from France.

Table 302.—World Production of Potash Minerals, 1937 and 1938

(Imperial Institute)

(Long tons)

Producing Country and Description	1937	1938	K ₂ O Content or Equivalent	
			1937	1938
BRITISH EMPIRE				
Palestine—				
Muriate (chloride).....	35,891	57,200	17,946	28,600
India—				
Nitrate (estimated).....	8,900	8,100	4,200	3,900
Australia—				
Alunite.....	334	438	(a)	(a)
Total (estimated).....			22,100	32,500
FOREIGN COUNTRIES				
France (b)—				
K ₂ O equivalent—				
Sylvinite, etc.:				
12-22%.....	651,463	815,369	482,064	572,600
30-40%.....	179,397	254,299		
50% and over.....	499,608	573,265		
Germany—				
Kainite, sylvinite, etc.....	12,585,771	(a)	1,769,471	(c)
Carnallite, etc.....	1,646,003	(a)	167,857	1,832,000
Italy—				
Alunite.....	3,445	2,734	400	320
Poland—				
Kainite.....	109,598	118,228	10,960	104,353
Sylvite.....	389,632	420,593	85,719	
Langbeinit.....	14,016	19,338	1,682	
U.S.S.R.—				
Crude salts.....	2,400,000	(a)	250,000	120,000
Eritrea—				
Niccoli salts.....	(a)	(a)	(a)	(a)
United States—				
Crude salts.....	434,009	477,629	254,015	282,992
Korea—				
Alunite (impure).....	147,000	(a)	(a)	(a)
Total.....			3,000,000	2,900,000
World's Total.....			3,000,000	2,900,000

Potash minerals are also produced in Spain.

(a) Information not available.

(b) Sale salts mined were as follows—1937—2,837,953 long tons
1938—3,321,501 “

(c) Saleable products.

PYRITES (Sulphur)

The sulphur content of iron pyrites shipped and sulphur recovered from non-ferrous smelter gas in 1938 totalled 112,395 short tons valued at \$1,044,817 compared with the all time high output of 130,913 short tons at \$1,154,992 in 1937. Production in 1938, as in immediate preceding years, came from the provinces of Quebec, Ontario and British Columbia. The corresponding sulphur production in Canada during the first six months of 1939 totalled 71,747 short tons valued at \$652,070 as against 58,930 tons at \$577,011 in the first half of 1938.

No iron pyrites deposits, known as such, have been mined in Canada for some years and statistics published regarding recent pyrites production refer to by-product iron pyrites recovered in the mining and concentrating of copper-gold-silver ores.

Sulphur employed in the manufacture of sulphuric acid during 1938 was recovered from salvaged smelter gas in Ontario and British Columbia. In Ontario, Canadian Industries Limited continued the operation of its acid plant at Copper Cliff, using sulphur dioxide obtained from the smelter of the International Nickel Company, while in British Columbia the Consolidated Mining and Smelting Company of Canada, Limited, manufactured sulphuric acid and other chemical products at Trail, using the by-product gases of its metallurgical plants. During 1938 a complete new hydrogen unit was added to the ammonia plant of the Consolidated Mining and Smelting Co. Ltd.; the company reported that the ammonia production should average 100 tons per day—an increase of about 18 tons of ammonia per day. This in turn corresponds to an increase of 72

tons in the ammonium sulphate production, or its equivalent in ammonium phosphates, and at the same time makes it possible to increase the elemental sulphur production by 27 tons per day. Two 120-ton Monsanto sulphuric acid units were completed by the company in 1938—one going into service in November and the other in December. These plants bring the sulphuric acid capacity of the Trail plant up to 600 tons of 100 per cent sulphuric acid per day. A third 50-ton reduction unit was added to the sulphur plant; production of sulphur and fertilizer in the chemical plants was 170,108 tons in 1938 and 115,586 tons in 1937.

During 1938 iron pyrites was concentrated and shipped in the province of Quebec by the Aldermac Copper Corporation Ltd. Beauchastel township, Temiscamingue county, and by the Consolidated Copper and Sulphur Company Ltd., Eustis. The only other Canadian producer of iron pyrites in 1938 was the Britannia Mining and Smelting Co. Ltd., Britannia Beach, British Columbia. The greater part of the iron pyrites produced in Canada during the year under review was exported to foreign countries.

In British Columbia. Northern Pyrites Ltd., conducted work during 1938 on a pyrites deposit located on the east side of the Ecstall River about 45 miles from Port Essington. In 1938 several permanent buildings were erected and a 750 cubic-foot air compressor installed; a development adit 9 x 8 feet in section was started and is to be driven approximately 2,800 feet; twenty-three men were employed. The Matachewan Hub Pioneer Mines Ltd., with a pyrites deposit in Cairo township, District of Matachewan, Ontario, reported that research work was carried on during 1938 and a pilot plant was established in Toronto for the purpose of working out a process of sulphur and iron recovery. No mining development work was conducted at the deposit during 1938.

"Metal and Mineral Markets"—New York October 1939 quotation for iron pyrites was per long ton unit of sulphur, c.i.f. United States ports, guaranteed 48 per cent sulphur, Spanish 12 cents. Sulphur—per long ton for domestic market \$16 f.o.b. Texas Mines. "Canadian chemistry and process Industries" Toronto quoted sulphur September 1939:—sulphur, crude, contracts f.o.b. cars at mines, long ton \$18.00 to \$20.00; crude, contracts, ex vessel, St. Lawrence and Maritime ports long ton \$23.50 to \$25.50.

Table 303.—Production of Sulphur† in Canada, 1929-1938

Year	Tons	\$
1929	42,781	350,843
1930	37,730	314,835
1931	50,107	429,457
1932	53,172	470,014
1933	57,373	510,299
1934	51,537	515,502
1935	67,446	634,235
1936	122,132	1,033,055
1937	130,913	1,154,992
1938	112,395	1,044,817

† Sulphur in iron pyrites shipped plus sulphur recovered from non-ferrous smelter gases.

(a) 1929-1938 includes sulphur recovered from smelter gas.

Table 304.—Production in Canada of Pyrites with Sulphur Content, including Sulphur Contained in Sulphuric Acid, Etc., made from Smelter Gases, 1937 and 1938

	Pyrites (*)			Smelter Gas		Total Sulphur	
	Sales	Sulphur content		Sulphur content		Tons	Value
	Tons	Tons	Value	Tons	Value		
1937			\$		\$		\$
Quebec.....	56,760	28,534	194,496			28,534	194,496
Ontario.....				14,009	140,090	14,009	140,090
British Columbia.....	62,698	31,647	253,176	(b) 56,723	567,230	88,370	820,406
Canada.....	119,458	60,181	447,672	70,732	707,320	130,913	1,154,992
1938							
Quebec.....	33,179	16,580	98,261			16,580	98,261
Ontario.....				16,897	168,970	16,897	168,970
British Columbia.....	11,425	5,797	46,376	(b) 73,121	731,210	78,918	777,586
Canada.....	44,604	22,377	144,637	90,018	900,180	112,395	1,044,817

(*) Recovered from copper ores.

(b) Includes elemental sulphur and sulphur in sulphuric acid and direct ammonium sulphate.

Table 305.—Imports Into Canada of Brimstone and Sulphur, 1931-1938

Year	Cwt.	\$	Year	Cwt.	\$
1931.....	2,483,842	2,281,654	1935.....	2,733,499	2,297,659
1932.....	2,099,895	2,023,085	1936.....	3,375,484	2,802,282
1933.....	2,816,202	2,529,920	1937.....	(a) 4,513,683	3,669,082
1934.....	3,153,943	2,589,311	1938.....	(b) 1,873,938	1,471,741

(a) 4,511,961 cwt. from United States.

(b) 1,872,536 cwt. from United States.

Table 306.—Exports of Sulphur Contained in Iron Pyrites, 1931-1938

Year	Tons	\$	Year	Tons	\$
1931.....	26,613	139,814	1935.....	7,610	48,446
1932.....	17,455	89,568	1936.....	52,192	284,718
1933.....	15,347	121,280	1937.....	46,317	251,834
1934.....	9,821	94,623	1938.....	122,109	145,189

† 16,551 tons valued at \$115,881 to United States.

Production of sulphuric acid in Canada totalled 268,339 tons (66°Bé) in 1938 compared with 282,716 tons in 1937; imports of sulphuric acid amounted to 95 tons valued at \$10,944 in 1938 and exports totalled 1,260 tons at \$17,900. Canadian consumption of sulphuric acid in 1937 included 172,570 short tons for fertilizers; 23,179 tons for coke and gas; 16,342 tons for explosives and 11,543 tons for petroleum refining. Canadian plants manufacturing sulphuric acid in 1938 were located at Copper Cliff, Sulphide, and Hamilton, in Ontario; New Westminster, Barnet and Trail in British Columbia and Sydney, Nova Scotia.

Table 307.—Consumption of Sulphur by Specified Canadian Industries, 1937 and 1938

Industry	1937		1938	
	Tone	\$	Tons	\$
Wood-pulp.....	165,559	3,827,991	106,255	2,433,161
Petroleum refining.....	95	6,776	140	8,128
Acids, alkalies and salts.....	21,329	403,511	12,103	246,774
Matches.....	63	3,043	67	3,130
Explosives.....	2,577	62,075	2,284	60,712
Insecticides.....	1,023	35,077	1,163	40,463
Adhesives.....	70	2,336	71	2,487
Chemicals, miscellaneous.....	32	994	3	136
Rubber.....	1,393	60,370	1,115	49,262
Sugar.....	157	7,104	133	6,280
Fruit and vegetable preparations.....	33	2,343	20	1,525
Other industries (*).....	224	7,895	195	7,177

(*) Starch and glucose, dyeing and finishing of textiles.

Table 308.—World Production of Pyrites, 1937 and 1938

(including Cupreous Pyrites)
(Imperial Institute, London)
(Long tons)

Producing Country	1937	1938	Estimated Sulphur Content	
			1937	1938
BRITISH EMPIRE				
United Kingdom.....	4,627	4,282	(a)	(a)
Southern Rhodesia.....	20,020	26,688	8,000	10,700
Union of South Africa.....	28,378	30,528	12,727	13,727
Canada (c).....	106,659	39,825	53,733	19,979
Cyprus.....	796,196	763,595	398,098	381,795
Australia.....	40,630	50,277	(a)	(a)
Total.....	964,000	915,000		
FOREIGN COUNTRIES				
Czecho-Slovakia.....	18,071	(a)	7,590	(a)
Finland (b).....	89,969	101,353	40,500	45,600
France.....	143,604	144,883	64,000	65,000
Germany.....	417,354	410,000	176,672	173,000
Greece.....	203,386	(a)	93,709	
Italy.....	900,080	915,619	420,000	430,000
Norway.....	1,031,744	994,000	445,557	427,000
Poland.....	80,963	90,753	34,800	39,000
Portugal.....	594,590	549,509	279,500	258,300
Roumania.....	10,548	11,028	6,611	6,950
Sweden.....	170,236	183,446	74,147	83,013
Yugoslavia.....	131,922	148,027	59,400	66,600
Algeria.....	38,148	43,256	16,788	20,260
United States (d).....	584,166	555,629	231,800	218,900
Japan.....	(a)	(a)	(a)	(a)
Korea.....	77,250	(a)	(a)	(a)
Manchuria.....	(a)	(a)	(a)	(a)

Pyrites is also produced in Belgium, Spain, U.S.S.R. and China.

(a) Information not available.

(b) Pyrite concentrate only.

(c) Includes pyrite ore, also concentrates made from copper ores.

(d) Includes by-product pyrite from zinc operations in Wisconsin and New York, and pyrite and pyrrhotite concentrates from copper operations in Tennessee.

SILICA BRICK

The production of silica brick in Canada during 1938 totalled 1,788 M valued at \$100,403 compared with 3,744 M worth \$181,126 in 1937. The manufacture of these refractories was confined, in both years, to the plants of the Dominion Steel and Coal Company, Ltd., at Sydney, Nova Scotia, and the Algoma Steel Corporation Ltd., Sault Ste. Marie, Ontario. The brick manufactured by both of these companies are processed from crushed silica rock and are utilized in furnace construction and repairs.

Table 309.—Production of Silica Brick in Canada, 1929-1938

Year	M	\$	Year	M	\$
1929.....	3,951	173,581	1934.....	2,528	85,945
1930.....	2,418	97,379	1935.....	2,461	96,194
1931.....	900	35,746	1936.....	2,393	97,285
1932.....	93	4,304	1937.....	3,744	181,126
1933.....	636	23,185	1938.....	1,788	100,403

Table 310.—Imports of Silica Brick* Into Canada, 1931-1938

Year	\$	Year	\$
1931.....	234,909	1935.....	215,500
1932.....	122,952	1936.....	(a) 261,974
1933.....	147,901	1937.....	(b) 539,253
1934.....	210,190	1938.....	(c) 240,184

(*) Containing not less than 90 per cent silica.

(a) \$261,952 from the United States.

(b) \$527,444 from the United States.

(c) All from the United States.

SODIUM CARBONATE (NATURAL)

Production of natural sodium carbonate in Canada during 1938 totalled 252 short tons valued at \$2,268 compared with 286 tons at \$2,574 in 1937. Deposits of this material in the form of "natron" (sodium carbonate with 10 molecules of water) and also as brine, occur in a number of "lakes" throughout the central part of the province of British Columbia, chiefly in the Clinton mining division, around 70 Mile House, and in the neighbourhood of Kamloops. Production in Canada during recent years has come entirely from deposits in British Columbia and in 1938 all commercial shipments of primary or mine material were made from Seventy Mile and Chasm on the line of the Pacific Great Eastern Railway. The first commercial shipments of natural sodium carbonate from Canadian deposits were recorded for 1921 in which year 197 short tons valued at \$14,775 were reported as sold. The total Canadian production of the material to the end of 1938 totalled 8,159 short tons valued at \$97,470.

Table 311.—Production of Sodium Carbonate (Natural) in Canada, 1929-1938

Year	Tons	\$	Year	Tons	\$
1929.....	600	8,100	1934.....	244	1,920
1930.....	364	4,550	1935.....	242	2,430
1931.....	712	7,351	1936.....	192	1,677
1932.....	495	5,450	1937.....	286	2,574
1933.....	559	5,773	1938.....	252	2,268

Table 312.—Imports of Bicarbonate of Soda and Soda Ash, 1931-1938

Years	Bicarbonate of soda		Soda ash or barilla	
	Pounds	\$	Pounds	\$
1931.....	10,931,335	188,268	1,647,304	25,771
1932.....	10,592,208	196,841	1,803,951	27,751
1933.....	11,716,431	211,065	1,616,433	23,256
1934.....	11,918,011	205,058	2,311,498	32,258
1935.....	12,009,724	207,325	2,647,572	37,995
1936.....	11,927,818	197,904	3,184,692	43,503
1937.....	12,835,249	199,011	†10,103,477	113,219
1938.....	12,456,313	185,940	2,908,364	41,831

† 10,101,867 pounds from the United States and 1,610 pounds from the United Kingdom in 1937 and 2,907,264 pounds at \$41,808 from United States in 1938.

"Canadian Chemistry and Metallurgy"—Toronto—quoted soda ash (September, 1939)—bags of 100 pounds, \$2.00.

Imports of soda ash into Canada in 1918 totalled 45,569 tons valued at \$1,973,641; caustic soda 6,180 tons valued at \$623,023 and sal soda, 5,691 tons at \$174,555. Imports of soda ash or barilla in 1913 totalled 33,162 tons valued at \$492,115; caustic soda 7,948 tons at \$286,432 (25 lb. packages†) and sal soda 4,344 tons worth \$53,649. In 1918-1919 a plant for the production of soda ash was under construction at Amherstburg, Ontario. With a view to encourage the manufacture of caustic soda in Canadian plants, the Dominion Government early in 1914 increased the duty on caustic soda. Previous to 1911 the salt industry of Canada was confined to the production of salt, but in that year, the Canadian Salt Company, at their Sandwich (Ontario) plant, commenced the manufacture of caustic soda by the electrolytic method.

Table 313.—Consumption of Soda Ash (Sodium Carbonate) in Specified Canadian Industries

Industry	Unit	1937		1938	
			\$		\$
Chemicals and allied products (a).....	pounds	29,511,323	430,657	30,034,048	437,833
Manufactures of non-metallic minerals (b).....	pounds	62,582,000	817,455	59,092,431	757,283
Pulp and paper.....	tons	2,696	91,989	2,166	73,236
Textiles (dyeing and finishing).....	pounds	324,247	5,827	299,601	5,575
Sugar refineries.....	pounds	190,320	4,134	189,171	4,118
Dyeing, cleaning and laundry work.....	pounds	795,312	25,534	860,315	22,073

(a) Includes acids, salts, explosives, soap, etc.

(b) Includes coke and gas, glass and petroleum refining.

SODIUM SULPHATE

(Glauber's Salt and Salt Cake)

Producers' shipments of natural sodium sulphate in Canada totalled 63,009 short tons valued at \$553,307 in 1938 compared with the all time high output of 79,884 tons at \$618,028 in 1937.

Sodium sulphate is recovered in Canada almost entirely in the province of Saskatchewan and is produced either as hydrated sodium sulphate, known as Glauber's salt, or anhydrous sodium sulphate, known to the trade as "salt cake". It occurs as crystals (Glauber's salt) or in the form of partially saturated or saturated brines in many lakes throughout Western Canada. Some of the Saskatchewan properties are equipped with plants for the purification and dehydration of the crude salt. It is interesting to note that a relatively small commercial output of the mineral was recorded in the province of Alberta during 1937 and 1938. The increased demand for sodium sulphate from the pulp mills and the nickel-copper smelting industry was largely responsible for the large increase in output of sodium sulphate in recent years.

The total commercial shipments of Canadian natural sodium sulphate since the commencement of production in 1920 to the close of 1938 totalled 510,301 short tons valued at \$4,371,546.

During 1938 seven firms, five in Saskatchewan and two in Alberta, reported production of natural sodium sulphate; capital employed by the industry was reported at \$903,237; fuel, purchased electricity and process supplies consumed totalled \$184,306 and \$138,901 were distributed as salaries and wages to 108 employees.

"Canadian Chemistry and Metallurgy"—Toronto—(September, 1939)—quoted sodium sulphate (Glauber's salt), crystals, in bags, cwt., to \$1.25; carlots, bulk—\$16.00 per ton; anhydrous, bags \$25.00 to \$35.00 per ton.

Table 314.—Production of Natural Sodium Sulphate* in Canada, 1929-1938

Year	Short tons	\$	Year	Short tons	\$
1929.....	5,018	64,112	1934.....	66,821	587,986
1930.....	31,571	293,847	1935.....	44,817	343,764
1931.....	44,957	421,097	1936.....	75,598	552,681
1932.....	22,466	271,736	1937.....	79,804	617,548
1933.....	50,080	485,416	1938.....	63,009	553,307

(*) Produced in the province of Saskatchewan, with the exception of 80 tons valued at \$480 produced in Alberta during 1937 and 89 tons worth \$1,127 produced in the same province in 1938.

Table 315.—Salt Cake Used in the Manufacture of Canadian Wood-Pulp and in the Acids, Alkalies and Salts Industry, 1932-1938

Year	Medicinal and pharmaceutical industry		Acids, alkalies† and salts industry		Wood-pulp	
	Tons	Value	Tons	Value	Tons	Value
		\$		\$		\$
1932.....			94	1,811	24,301	489,343
1933.....	30	4,879	9,968	146,201	20,563	580,251
1934.....	51	7,278	26,075	368,576	34,559	655,905
1935.....	59	4,617	22,485	316,734	35,350	642,801
1936.....	27	2,546	7,220	102,176	41,524	711,635
1937.....	29	2,234	8,006	113,054	50,584	884,437
1938.....	21	1,593	3,412	48,486	33,213	588,217

† The 1932, 1936, 1937 and 1938 figures do not include sodium sulphate consumed direct in the smelting of nickel-copper ores.

Table 316.—Imports of Glauber's Salt and Salt Cake into Canada, 1931-1938

Year	Glauber's Salt		Salt Cake (Sulphate of Soda)	
	Pounds	\$	Pounds	\$
1931.....	1,999,042	10,838	17,321,652	97,215
1932.....	1,806,882	11,027	8,865,730	51,925
1933.....	1,791,011	13,237	5,191,036	34,371
1934.....	1,266,665	8,553	21,154,815	123,980
1935.....	3,167,715	26,591	10,352,070	49,354
1936.....	2,510,103	27,521	(a) 23,494,805	110,676
1937.....	(b) 3,512,363	25,090	(b) 23,234,278	132,352
1938.....	(c) 4,532,986	30,288	(d) 11,572,628	61,122

* Of the 1936 imports, 2,037,970 pounds came from Germany, 248,716 pounds came from the United States and 80,784 pounds came from the United Kingdom.

(a) Of the 1936 imports, 9,202,577 pounds came from the United States and 14,291,928 pounds from the United Kingdom.

† Of the 1937 imports 3,307,638 pounds valued at \$21,882 came from Germany.

(b) Of the 1937 imports 17,755,034 pounds valued at \$78,168 came from the United States and 10,479,244 pounds at \$54,184 from the United Kingdom.

(c) 4,344,748 pounds at \$26,706 from Germany.

(d) 9,537,472 pounds at \$50,809 from the United Kingdom.

STRONTIUM MINERALS

Four celestite (Sr SO_4) deposits of economic interest occur in eastern Ontario but there has been no commercial production of the mineral in Canada for several years. A special report prepared by the Imperial Institute, London, refers to strontium minerals, as follows—"The reserves of strontium minerals, however, in both England and Germany appear to be limited, and it is possible that the known deposits in Canada, United States, France, Tunis, and the U.S.S.R. will be opened up and exploited to an increasing extent in the future. . . . Strontium minerals are used principally in the beet-sugar industry; in pyrotechnics; as fillers, as "cleansers" for removing sulphur and phosphorus from special steels; as precipitants in the purification of caustic soda; in the chemical, pharmaceutical and ceramic industries; and in certain refrigerators". Strontium nitrate is used in Canada in the manufacture of pyrotechnics but the amount is not available for publication. No production of strontium ore in the United States has been reported since 1918 and domestic needs in that country are supplied by imports which in 1938 comprised 552,868 pounds of strontionite and celestite valued at \$2,824; strontium nitrate 364,362 pounds at \$23,921 and precipitated carbonate (and oxide) 82,859 pounds worth \$8,502. Data relating to Canadian imports of strontium minerals and chemicals are not shown separately in the Canadian customs classification.

"Metal and Mineral Markets" New York, October 1939 quoted—per ton in carload lots, 90 per cent Sr SO_4 , finely powdered, \$37. Strontionite—per ton, lump in carload lots, minimum 84-86 per cent Sr CO_3 \$55—nominal.

Table 317.—Production of Miscellaneous Non-Metallic Minerals in Canada, 1937 and 1938

Item	Unit of measure	1937		1938	
		Quantity	Value	Quantity	Value
Bituminous sands.....	Ton	35	\$ 142	(d)	\$ (d)
Diatomite (c).....	Ton	643	18,606	398	13,842
Fluorspar.....	Ton	150	2,550	217	3,906
Graphite.....	\$		125,343		41,590
Grindstones (b) (c).....	Ton	412	21,429	306	16,198
Lithium minerals.....	\$		1,694		
Magnesium sulphate.....	Ton	727	14,456	470	9,400
Magnesian dolomite.....	\$		677,207		420,261
Mineral waters.....	Imp. gal.	225,019	20,586	188,309	21,619
Peat production.....	Ton	478	2,676	620	3,500
Phosphate (a).....	Ton	100	900	208	1,886
Silica brick.....	M	3,744	181,126	1,788	100,403
Sodium carbonate.....	Ton	236	2,574	252	2,268
Sodium sulphate.....	Ton	79,884	618,028	63,009	553,307
Total (Gross).....	\$		1,687,317		1,188,180
Sulphur production(*).....	Ton	130,913	1,154,992	112,395	1,044,817

(a) Represents apatite mined in Quebec.

(b) Includes pulpstones, etc.

(c) In preceding years included under the natural abrasives industry.

(*) Includes sulphur content of pyrites at its sales value and estimated figures for quantity and value of sulphur in smelter gases used for acid making or recovered as elemental sulphur, or in ammonium sulphate (direct). General statistics relating to production of sulphur are included with those of the copper-gold mining and non-ferrous smelting industries.

(d) Included in 1933 with petroleum refining industry. No crude material sold in 1938.

Table 318.—Principal Statistics Relating to Miscellaneous Non-Metal Mining Industries in Canada, 1937 and 1938 (a)

	1937	1938
Number of plants.....	53	50
Capital employed.....	\$ 3,050,876	2,787,671
Number of employees—On salary.....	78	71
On wages.....	452	323
Total.....	530	394
Salaries and wages—Salaries.....	\$ 143,820	134,727
Wages.....	\$ 514,903	340,840
Total.....	\$ 658,723	475,567
Selling value of products (gross).....	\$ 1,687,317	1,188,322
Cost of fuel and electricity.....	\$ 321,919	274,670
Cost of process supplies used.....	\$ 228,953	134,559
Selling value of products (net).....	\$ 1,136,445	779,093

(a) Statistics for 1937 and 1938 are not entirely comparable with those for preceding years in that data relating to production of natural abrasives were included with "miscellaneous non-metallic minerals" for the first time in 1937.

Table 319.—Capital Employed in the Miscellaneous Non-Metal Mining Industries in Canada, 1938

	\$
CAPITAL EMPLOYED AS REPRESENTED BY:—	
Present cash value of the land (excluding minerals).....	615,816
Present value of buildings, fixtures, machinery, tools and other equipment.....	1,642,756
Inventory value of materials on hand, ore in process, fuel and miscellaneous supplies on hand.....	128,271
Inventory value of finished products on hand.....	156,982
Operating capital (cash, bills and accounts receivable, prepaid expenses, etc.).....	243,846
Total.....	2,787,671

Table 320.—Wage-earners, by Months, in the Miscellaneous Non-Metal Mining Industries in Canada, 1937-1938

Month	1937	1938		
		Mine		Mill
		Surface	Under-ground	
January.....	320	155	24	103
February.....	335	147	26	131
March.....	343	111	12	164
April.....	396	154	28	106
May.....	447	159	39	130
June.....	555	265	34	78
July.....	562	230	2	50
August.....	519	246	21	79
September.....	520	249	20	120
October.....	491	212	22	113
November.....	512	192	10	148
December.....	384	136	4	123
Average.....	452	191	20	112

CHAPTER NINE

CLAY PRODUCTS AND OTHER STRUCTURAL MATERIALS

Including Cement, Clay and Clay Products (Brick, Drain Tile, Kaolin, Sewer Pipe, Structural Tile, Stoneware and Pottery made from Domestic Clays, Fireclay, Firebrick, Fireclay Blocks and Shapes, Imported-Clay Products), Lime, Sand and Gravel, Sand-Lime Brick, and Stone, including Slate.

Grouped in this chapter are those industries producing structural materials of non-metallic composition. During the depression years, immediately following 1929, these important branches of the Canadian mineral industry suffered severe economic losses. Production declined and employment fell to a relatively low level. Shipments of cement, lime, stone, clay products, sand and gravel totalled \$58,534,834 in 1929; this high record value was succeeded by unbroken annual decreases to \$16,696,683 in 1933, from which year recovery has been relatively slow, however, a distinct advance was realized in 1937 when the value of these materials aggregated \$34,869,699 or an increase of 35.31 per cent over the corresponding value of \$25,770,741 in the preceding year. In 1938 there was a slight increase over 1937 in the value of clay products also the output of sand and gravel was considerably greater, however, the total value of all structural materials produced in 1938 at \$33,878,666 represents a decrease of \$999,033 from the corresponding value of the preceding year. During 1938 the structural materials producing industries distributed \$10,992,702 in salaries and wages to 13,917 employees compared with \$18,608,687 to 23,897 employees in 1929 and \$12,112,581 to 11,420 in 1923.

There has been an increasing consumption of stone and lime for other than building purposes. This has been particularly evident in recent years and is the result of expansion in certain industries where these materials are utilized in various chemical processes. Shipments of stone and lime for these purposes are classified, for convenience, with data relating to production of these same materials for structural purposes. However, statistics pertaining to their consumption for industrial purposes are segregated in the following tables.

Table 321.—Value of Construction Contracts Awarded, by Provinces, 1933-1938

(Maclean Building Reports Ltd.)

Provinces	1933	1934	1935	1936	1937	1938
	\$	\$	\$	\$	\$	\$
Maritimes.....	* 7,218,700	9,968,600	14,373,500	17,908,800	21,557,200	19,522,800
Quebec.....	32,539,200	34,135,500	44,471,900	45,749,500	71,940,800	65,778,900
Ontario.....	42,573,400	63,358,300	70,872,800	72,393,300	97,777,400	73,070,100
Manitoba.....	2,138,000	3,905,000	8,744,400	6,994,400	7,945,100	6,115,200
Saskatchewan.....	775,200	1,583,200	3,841,300	2,200,600	6,704,900	3,969,000
Alberta.....	2,825,900	3,489,400	5,893,000	6,297,400	4,901,000	8,180,000
British Columbia.....	9,219,400	9,391,500	12,108,100	11,044,000	13,230,300	10,641,900
Canada.....	97,289,800	125,811,500	160,305,000	162,588,000	224,056,700	187,277,900

Table 322.—Description and Total Value of Work Performed in Canada by General and Trade Contractors (including Subcontractors), Municipalities, Harbour Commissions, Provincial and Dominion Government Departments in 1937 and 1938.

(Construction Branch, Dominion Bureau of Statistics)

	1937	1938
	\$	\$
BUILDING CONSTRUCTION—		
Dwelling, single.....	29,231,314	30,709,570
Dwelling, semi-detached or double.....	2,728,090	3,324,336
Duplexes.....	2,890,972	4,445,338
Apartment houses.....	5,825,241	7,944,612
Hotels, clubs, restaurants, etc.....	3,174,010	2,556,126
Churches and church halls.....	2,538,511	3,062,767
Hospitals and sanatoria.....	3,791,606	7,334,820
Schools, institutions, etc.....	7,260,284	11,831,167
Office buildings.....	8,362,412	8,013,402

Table 322.—Description and Total Value of Work Performed in Canada by General and Trade Contractors (including Subcontractors), Municipalities, Harbour Commissions, Provincial and Dominion Government Departments in 1937 and 1938—Con.

	1937	1938
	\$	\$
BUILDING CONSTRUCTION—Concluded		
Stores.....	7,915,622	9,755,082
Theatres and amusement halls.....	1,665,743	2,541,028
Factories, warehouses and storehouses.....	35,982,590	24,275,807
Grain elevators.....	3,281,431	3,445,073
Garages.....	2,246,870	1,770,986
Service stations.....	2,122,145	3,337,899
Mine buildings.....	4,709,235	4,615,059
Farm buildings.....	1,344,309	1,426,214
Radio stations.....		263,697
Armouries.....		427,223
Aeroplane hangars.....		513,426
Buildings, unable to specify.....	5,378,613	3,318,543
ENGINEERING CONSTRUCTION—		
Hard surfaced or paved streets, highways, etc.....	38,625,244	32,129,062
Gravel or stone surfaced streets, highways, etc.....	29,914,507	33,342,919
Dirt or clay roads.....	7,620,496	6,564,092
Grading, scraping, oiling, filling, etc.....	12,522,674	12,554,539
Sidewalks.....	1,255,254	2,573,840
Roadside maintenance and area improvement.....	2,127,635	1,814,980
Bridges, viaducts, all types.....	12,351,378	9,919,754
Subways, overhead crossings, etc.....	729,891	717,952
Culverts.....	2,352,746	2,239,018
Watermains and connections.....	4,870,399	6,400,418
Sewers and connections.....	2,572,198	3,135,094
Storm sewers.....	1,062,043	1,905,142
Tile drains, drainage ditches and open sewers.....	529,453	548,787
Dams and reservoirs.....	1,904,123	2,404,864
Fencing (excluding temporary snow fencing).....	890,980	887,226
Guard rails.....	274,645	211,004
Signs.....	242,135	396,499
Zone painting.....	124,682	143,017
Electric stations, power plants, etc.....	14,988,028	20,641,445
Transmission lines and towers.....	9,593,047	7,318,056
Installation of boilers and machinery.....		229,013
Railway (steam) construction work.....	2,631,983	265,680
Railway (electric) construction work.....	247,476	
Aerodromes or landing fields.....	1,172,125	3,521,118
Park systems.....	1,895,226	1,838,475
Grounds and walks.....	312,204	348,226
Underground conduits.....	261,705	
Engineering, unable to specify.....	7,588,801	4,360,444
HARBOURS, RIVERS, ETC.—		
Docks, wharves, piers and breakwaters.....	8,001,048	6,548,349
Retaining walls, embankments and riprapping.....		1,785,239
Canals and waterways.....	369,541	460,626
Dredging.....	4,654,314	6,261,867
Pile driving.....	258,390	137,745
Works, unable to specify.....	13,894	23,141
TRADE CONSTRUCTION—		
Air conditioning.....	613,650	783,773
Brick laying.....	905,156	883,143
Carpentry work.....	1,206,546	1,862,973
Commercial refrigeration.....	903,428	565,040
Concreting and cement work.....	967,629	1,005,764
Electrical work.....	5,224,308	5,359,723
Elevators service.....	1,982,697	1,970,545
Excavating.....	1,187,579	646,958
Flooring.....	404,601	470,465
Glass and glazing.....	579,095	753,589
Lathing, plastering and stucco.....	1,265,421	1,205,389
Masonry and stone work.....	306,398	279,974
Ornamental iron work.....	298,097	431,804
Painting and decorating.....	4,964,660	5,019,961
Plumbing, heating and sanitary engineering.....	16,363,778	15,835,689
Roofing, sheet metal.....	1,076,686	1,027,800
Roofing, all other.....	1,961,479	2,034,562
Sheet metal work, other than roofing.....	3,041,028	2,889,782
Sprinkler installation.....	577,956	342,924
Structural steel work.....	1,652,550	850,385
Tiling, marble and terrazzo.....	743,028	609,072
Weatherstripping and insulation.....	683,381	621,593
Wrecking and demolition.....	226,287	231,176
Trades, unable to specify.....	880,328	1,000,495
Total.....	351,874,114	353,223,285

Table 324.—Description and Value of Work Performed in Canada by all Trade and Subcontractors, 1937 and 1938 (*)

Nature	1937	1938
Air conditioning.....	974,495	1,340,166
Brick laying.....	1,838,891	2,037,351
Carpentry work.....	1,759,484	2,541,407
Concreting and cement work.....	2,094,417	2,059,838
Electrical work.....	8,449,179	9,459,416
Elevators, service.....	2,427,053	2,315,335
Excavating.....	915,976	1,029,069
Flooring, all kinds.....	1,120,029	1,252,982
Glass and glazing.....	2,369,274	2,002,754
Lathing, plastering and stucco.....	3,638,632	4,504,585
Masonry and stone work.....	1,049,419	935,602
Ornamental iron work.....	1,198,885	1,221,620
Painting and decorating.....	6,462,081	7,174,262
Plumbing, heating and sanitary engineering.....	23,436,065	25,479,331
Roofing.....	5,069,698	5,033,905
Sheet metal work, other than roofing.....	4,751,018	4,541,516
Sprinkler installation.....	1,032,847	896,042
Structural steel work.....	16,199,867	17,360,625
Tiling, marble and terrazzo.....	2,436,764	2,955,638
Weatherstripping and insulation.....	982,843	1,110,080
All other trades.....	5,860,701	5,455,454
(b) Total value of work performed.....	94,067,618	100,706,978

(*) Supplied by the Construction Branch, Dominion Bureau of Statistics.

(b) Includes cost of materials used, etc.

NOTE.—These values are included in the preceding table.

Table 325.—Value of Clay Products and Other Structural Materials Produced in Canada, by Provinces, 1934-1938

Province	1934	1935	1936	1937	1938
	\$	\$	\$	\$	\$
Prince Edward Island.....			*27,663		
Nova Scotia.....	511,026	1,660,981	1,763,516	2,293,325	1,611,111
New Brunswick.....	669,726	1,241,957	931,827	1,128,931	2,188,889
Quebec.....	6,115,682	7,241,494	7,503,022	10,350,583	11,619,514
Ontario.....	8,988,681	8,894,538	10,326,967	15,121,178	11,997,177
Manitoba.....	761,742	1,459,614	1,666,789	1,673,124	1,805,875
Saskatchewan.....	260,030	269,320	380,115	585,673	781,224
Alberta.....	843,629	973,774	1,245,549	1,303,533	1,627,462
British Columbia.....	1,136,245	1,473,722	1,925,293	2,413,352	2,247,414
Canada—Gross Value.....	19,286,761	23,215,400	25,770,741	34,869,699	33,878,666
Net value.....	(a)	19,253,309	21,052,574	28,868,189	28,446,299

(a) Information not available. * Sand and gravel only.

Table 326.—Production, Imports, Exports, and Apparent Consumption of Clay Products and Other Structural Materials in Canada, 1935-1938

Item	Production	Imports	Exports	Apparent consumption
	\$	\$	\$	\$
Cement, Portland.....	1935 5,580,043	177,181	44,365	5,612,859
	1936 6,908,192	114,321	56,909	6,965,604
	1937 9,095,867	179,857	82,978	9,192,746
	1938 8,241,350	111,976	101,059	8,252,267
Clay and clay products.....	1935 3,012,563	6,438,042	526,824	8,923,781
	1936 3,471,027	7,351,148	777,143	10,045,032
	1937 4,516,859	9,108,976	1,056,767	12,569,068
	1938 4,536,084	7,657,202	1,034,148	11,159,138
Lime.....	1935 2,925,791	9,181	50,296	2,884,676
	1936 3,335,970	12,036	97,574	3,250,432
	1937 3,824,917	32,379	85,089	3,772,207
	1938 3,542,652	36,248	51,346	3,527,554
*Sand and gravel.....	1935 6,389,440	364,693	21,446	6,732,687
	1936 6,921,399	348,492	73,624	7,196,267
	1937 10,492,696	471,367	78,441	10,885,622
	1938 12,002,554	401,317	146,050	12,257,821
Stone (a).....	1935 5,307,563	452,312	110,895	5,648,980
	1936 5,134,153	482,681	105,182	5,511,652
	1937 6,939,360	747,518	250,458	7,436,420
	1938 5,556,026	481,868	220,145	5,817,749
Total.....	1935 23,215,400	7,341,409	753,826	29,802,983
	1936 25,770,741	8,308,678	1,110,432	32,968,987
	1937 34,869,699	10,540,097	1,553,733	43,856,063
	1938 33,878,666	8,688,611	1,552,748	41,014,529

* Sand and gravel imports include silica sand for glass and carborundum manufacture and for use in steel plants. This silica sand was valued at \$282,930 in 1935, \$270,824 in 1936, \$373,760 in 1937 and \$338,832 in 1938.

† Includes cement manufactures.

(a) Imports include slate manufactures but not mineral wool.

CEMENT

Sales of cement as reported by the Canadian Cement industry totalled 5,519,102 barrels valued at \$8,241,350 in 1938 compared with 6,168,971 barrels worth \$9,095,867 in 1937 and the all time high shipment of 12,284,081 barrels at \$19,337,235 in 1929. Of the 1938 sales 2,730,320 barrels were produced in Quebec plants, 1,818,032 barrels in Ontario and the balance in Manitoba, Alberta and British Columbia. The high and low prices per barrel in 1938 were \$2.35 and \$1.25 respectively as against \$2.68 and \$1.25 in the preceding year.

The number of firms reporting commercial production of cement in Canada during 1938 was three and the plants in operation totalled eight. Capital employed aggregated \$52,299,046 and the industry distributed \$1,306,331 in salaries and wages to 1,034 employees. The total value of fuel and electricity purchased during the year under review amounted to \$1,764,427 of which \$1,155,999 were expended for coal and \$583,858 for electricity. Process supplies consumed, including explosives, etc., were valued at \$529,157 and the following tonnages of primary materials of mineral origin were used in the manufacture of the final product; limestone 1,344,868, clay 143,421, gypsum 51,975, shale 13,821, sand 9,465 and iron pyrites 22. Imports of cement into the Dominion in 1938 numbered 48,497 barrels worth \$105,326 compared with 61,082 barrels at \$134,113 in 1937. Exports in 1938 totalled 89,419 barrels worth \$101,059 as against 72,568 barrels worth \$82,978 in 1937.

In 1938 the wet process was employed in all Canadian cement plants with the exception of one plant in Alberta where the dry method was continued. In the United States large modernization programmes have been reported. A device known as the "electric car" for controlling the feed of grinding mills has been installed in several plants and the use of roll scale, pyrite cinder or impure iron ore is increasing at Valley Forge, Pa. Froth flotation has been used successfully for the purification of cement raw materials; a similar treatment is employed in the Union of South Africa and at Parma, Argentina.

According to "Mineral Trade Notes" U.S. Department of Interior, high quality cement is to be manufactured at a new plant in Wurttemberg, Southern Germany, which will utilize oil-shale coke. The new plant will produce oil-shale coke and then process the material with limestone into a special high grade cement with unusual qualities of bending strength and impact resistance.

The total quantity of cement made in Canada during 1914 was 8,727,269 barrels of which 641,869 barrels were made from marl and 8,085,400 barrels from limestone and slag. The drop in consumption in the use of marl for the manufacture of cement is indicated by the fact that in 1908 forty-five per cent of the total production was made from marl and in 1914 this had decreased to seven decimal three per cent. In 1914 twenty-four plants were in operation but of these three were in commission for a few days only and of the others, seven were in operation less than five months.

A decline in the value of construction contracts awarded in Canada from a total of \$224,056,700 in 1937 to \$187,277,900 in 1938 was reflected in the 10.5 per cent decrease in quantity of cement sold by the Canadian Cement Industries during 1938. Wholesale prices were generally lower in Canada than in the preceding year with the index number for building and construction materials declining from 94.4 to 89.1 in 1938 (1926=100); lumber 98.1 to 89.8; miscellaneous materials 95.9 to 93.3; cement 106.2 to 102.4 and the general wholesale price index from 84.6 to 78.6.

Table 327.—Summary Statistics of Cement Production, Sales, Etc., in Canada, 1937 and 1938

	1937		1938	
	Barrels (*)	Value	Barrels (*)	Value
Output.....	6,142,934	\$	5,588,047	\$
Sold or used.....	6,168,971	9,095,867	5,519,102	8,241,350
Stocks on hand December 31st.....	1,806,343		1,875,288	
IMPORTS—				
Portland cement and hydraulic or water lime.....	61,082	134,113	48,497	105,326
Manufactures.....		45,744		6,650
Total Imports.....		179,857		111,976
EXPORTS—				
Portland cement.....	72,568	82,978	89,419	101,059
Apparent consumption.....	6,157,485		5,478,180	

(*) 1 barrel=350 pounds.

Table 328.—Production and Apparent Consumption of Cement in Canada, 1929-1938

Year	Sold or Used		Apparent Consumption
	Barrels	\$	Barrels
1929.....	12,284,081	19,337,235	12,105,950
1930.....	11,032,538	17,713,067	10,977,238
1931.....	10,161,658	15,826,243	10,085,986
1932.....	4,498,721	6,930,721	4,466,738
1933.....	3,007,432	4,536,935	2,974,020
1934.....	3,783,226	5,667,946	3,727,521
1935.....	3,648,086	5,580,043	3,610,217
1936.....	4,508,718	6,908,192	4,479,656
1937.....	6,168,971	9,095,867	6,157,485
1938.....	5,519,102	8,241,350	5,478,180

Table 329.—Producers' Sales of Cement in Canada, by Provinces, 1936-1938

Province	1936		1937		1938	
	Barrels	Value	Barrels	Value	Barrels	Value
		\$		\$		\$
Quebec.....	2,093,130	2,945,074	2,578,623	3,537,798	2,730,320	3,693,188
Ontario.....	1,542,463	2,180,895	2,650,652	3,607,067	1,818,032	2,555,214
Manitoba.....	348,042	783,095	328,518	745,736	330,889	754,427
Alberta.....	243,534	482,197	267,106	531,541	304,373	611,790
British Columbia.....	281,549	516,931	344,072	623,725	335,488	626,731
Canada.....	4,508,718	6,908,192	6,168,971	9,095,867	5,519,102	8,241,350

Table 330.—Kilns Used by Canadian Cement Industry, 1932-1938

Year	Total Daily Capacity	
	Number	Barrels
1932.....	47	43,882
1933.....	41	43,622
1934.....	41	43,922
1935.....	20	32,650
1936.....	19	33,000
1937.....	18	33,900
1938.....	†21	35,200

† 10 in use with a daily capacity of 23,100 barrels.

Table 331.—Specified Materials Used in Canadian Cement Plants, 1931-1938

Year	Shale	Limestone	Gypsum	Sand	Clay	Pyrites
	Tons	Tons	Tons	Tons	Tons	Tons
1931.....	(a)	2,489,147	56,677	(a)	(a)	(a)
1932.....	(a)	1,141,376	27,538	(a)	(a)	(a)
1933.....	(a)	616,364	13,319	(a)	(a)	(a)
1934.....	(a)	806,546	19,172	(a)	(a)	(a)
1935.....	(a)	818,443	21,611	5,047	(a)	(a)
1936.....	(a)	1,180,358	25,447	8,549	94,943	(a)
1937.....	(a)	1,465,168	33,691	9,281	195,877	444
1938.....	13,821	1,344,868	51,975	9,465	143,421	22

(a) Data not recorded.

Table 332.—Principal Statistics of the Cement Manufacturing Industry in Canada, 1937 and 1938

	1937	1938
Number of firms.....	4	3
Number of plants.....	9	8
Capital employed..... \$	54,150,672	52,299,046
Number of employees—On salary.....	100	100
On wages.....	983	934
Total.....	1,083	1,034
Salaries and wages—Salaries..... \$	211,778	218,445
Wages..... \$	1,161,666	1,087,886
Total..... \$	1,373,444	1,306,331
Selling value of products (gross)..... \$	9,095,867	8,241,350
Cost of fuel and electricity (b)..... \$	1,904,418	1,764,427
Cost of process supplies (c)..... \$	540,915	529,157
Net value of products sold..... \$	6,650,534	5,947,766

(a) Information not available.

(c) Other than item (b).

Table 333.—Capital Employed in the Cement Industry in Canada, 1938

	\$
CAPITAL EMPLOYED AS REPRESENTED BY:—	
Present cash value of the land.....	11,257,591
Present value of buildings, fixtures, machinery, tools and other equipment.....	34,944,341
Inventory value of materials on hand, ore in process, fuel and miscellaneous supplies on hand.....	905,522
Inventory value of finished products on hand.....	1,273,961
Operating capital (cash, bills and accounts receivable, prepaid expenses, etc.).....	3,917,631
Total.....	52,299,046

Table 334.—Wage-Earners on last day of Each Month, or Nearest Work day 1937 and 1938

Month	1937	1938	
		Quarry	Mill
January.....	757	84	759
February.....	784	95	765
March.....	847	118	770
April.....	991	111	846
May.....	985	130	930
June.....	1,090	127	891
July.....	1,095	121	818
August.....	1,090	126	830
September.....	1,086	137	896
October.....	1,082	138	897
November.....	1,064	116	800
December.....	947	74	637

Table 335.—World's Production of Cement, 1937 and 1938

(Taken from the Statistical Year-Book of the League of Nations)

NOTE.—This table covers, as far as possible, both natural and artificial (Portland, etc.) cements. Cement is made by burning a mixture of calcareous and argillaceous materials and grinding the resulting clinker. For natural cement, the mixture used is found as such in nature; for artificial cements, the constituents are mixed in the desired proportions.

(Metric tons—000's omitted)

Country	1937	1938	Country	1937	1938
Africa.....	1,488	1,620	U.S.S.R.....	5,837	.....
Algeria.....	65	.....	Europe (*) (2).....	(*) 39,500	44,000
Belgian Congo.....	26	.....	Germany and Saar.....	12,605	15,600
Egypt.....	330	376	Austria.....	429	.....
Morocco (French).....	156	165	Belgium (4).....	.....	.....
Mozambique.....	15	25	Bulgaria.....	154	194
Tunis.....	56	69	Denmark.....	676	640
Union of South Africa.....	840	878	Spain.....	.....	.....
North America.....	21,113	19,182	Estonia.....	69	79
Canada.....	975	882	Finland.....	433	.....
United States.....	20,138	18,300	France.....	4,285	.....
Mexico.....	345	373	Greece.....	290	308
South America.....	2,273	.....	Hungary.....	392	.....
Argentina.....	1,035	.....	Italy.....	4,258	4,587
Brazil.....	571	.....	Latvia.....	118	155
Chile.....	313	364	Norway.....	321	(*) 320
Colombia.....	123	.....	Netherlands.....	441	456
Peru.....	83	102	Poland.....	1,284	1,719
Uruguay.....	148	.....	Portugal.....	254	268
Asia (*).....	(*) 8,450	8,000	Roumania.....	464	.....
China.....	250	.....	United Kingdom.....	7,300	7,900
India.....	1,142	.....	Sweden.....	876	.....
Netherlands Indies.....	.....	.....	Czechoslovakia (*).....	.....	.....
French Indo-China.....	235	266	Turkey.....	215	.....
Japan and Col.....	6,034	5,469	Yugoslavia.....	619	712
Palestine.....	161	98	Oceania (*) (2).....	908	.....
Philippines.....	150	.....	Australia (a).....	732	863
Siam.....	77	82	New Zealand.....	176	.....
Syria and Lebanon.....	250	251	(*) Total.....	79,900	82,500

(*) Estimate. (a) Twelve months ending June 30. VI.

† Country not included in the totals.

(1) China: total shipments from "Customs ports", excluding Manchuria.

(2) Europe, Oceania; total includes estimate for other countries not mentioned.

THE CEMENT PRODUCTS INDUSTRY

Production of manufactured cement products in Canada during 1938 was valued at \$3,200,419, compared with \$3,299,331 during 1937.

A total of 117 plants operated in this industry during 1938—there being 69 in Ontario, 29 in Quebec, 11 in British Columbia, 3 in Alberta, 1 in Nova Scotia, and 2 each in New Brunswick, Manitoba and Saskatchewan. Many of these works were quite small, there being 49 with outputs of less than \$5,000 each while 54 were in the \$5,000 to \$50,000 group and only 16 were above \$50,000. The Ontario plants accounted for 51 per cent of the total production; establishments in Quebec contributed 31 per cent, and works in British Columbia accounted for more than 14 per cent, the remaining 4 per cent being distributed among New Brunswick, Nova Scotia, Manitoba, Saskatchewan and Alberta.

Products included ready-mixed concrete worth \$1,162,028, cement pipe of all kinds at \$464,916, hollow building blocks of cement at \$431,547, cinder blocks at \$238,092, artificial stone at \$155,660, cement bricks at \$86,383, and other items such as haydite blocks and slabs, laundry tubs, burial vaults, etc.

Data presented for this industry cover manufacturing only and do not include figures for the cement work done on the building of bridges, dams, foundations, etc.; this type of work has been covered in the annual survey of construction.

Table 337.—Products Made in the Cement Products Industry, by Provinces, 1938

Products	Quebec	Ontario	British Columbia	Other provinces	Canada
	\$	\$	\$	\$	\$
Cement bricks.....	25,949	58,801	1,150	483	86,383
Cement hollow building blocks, etc.....	100,790	322,344	2,564	5,849	431,547
Cement drain pipe, sewer pipe, water pipe and culvert tile.....	194,313	135,222	73,451	61,930	464,916
Artificial stone.....	58,267	90,637	4,197	2,559	155,660
Cement laundry tubs.....	174	63,404	12,745	.....	76,323
Cinder blocks.....	19,163	218,929	.....	.....	238,092
Cement stucco.....	.....	.....	7,700	7,118	14,818
Ready mixed concrete.....	528,256	320,087	312,863	.....	1,161,206
All other products.....	68,975	439,856	35,228	27,415	571,474
Total.....	995,887	1,649,280	449,898	105,354	3,200,419

Table 338.—Materials Used in the Cement Products Industry, by Provinces, 1938

Material	Quebec	Ontario	British Columbia	Other provinces	Canada
	\$	\$	\$	\$	\$
Portland cement.....	236,705	349,358	168,606	17,224	771,893
Quicklime.....	276	514	791	227	1,808
Sand.....	69,977	58,368	49,860	5,821	184,026
Gravel.....	2,123	45,497	1,485	1,637	50,742
Crushed stone.....	106,621	31,799	1,781	604	140,805
Cinders.....	5,498	22,215	.....	7	27,720
Reinforcing steel.....	19,009	20,633	10,248	7,228	57,118
Other materials.....	32,397	142,852	25,597	1,451	202,297
Boxes, crates, lumber, etc.....	381	11,909	2,920	550	15,760
Total.....	472,987	683,145	261,288	34,749	1,452,169

THE CLAY AND CLAY PRODUCTS INDUSTRY

The Clay and Clay Products Industry in Canada is classified into two divisions: (1) production from domestic clays, which includes the production of refractories, building brick, structural tile, floor tile, roofing tile, drain tile, sewer pipe, and pottery, and (2) production from imported clays, which includes the manufacture of porcelain insulators, refractories, earthenware, pottery, and ceramic floor and wall tile.

A total of 173 plants representing a capital investment of \$22,758,848 operated in the domestic and imported clay products industries in Canada during 1938. These two industries provided employment for 3,405 persons during the year; their earnings totalled \$3,304,742. The combined production in 1938 was valued at \$7,584,972 compared with \$8,116,040 in 1937.

1. Production from Domestic Clays, 1938

The gross value of Canadian producers' sales of domestic clay products totalled \$4,536,084 in 1938 compared with \$4,516,859 in 1937 and \$13,904,643 the all time high record value established in 1929. Commercial production of domestic clay products in 1938 was reported from every province except Prince Edward Island; no output of these materials has as yet been officially recorded for the Yukon and Northwest Territories. Of the total value of Canadian sales in 1938, Ontario and Quebec firms contributed \$2,083,496 and \$1,022,194. respectively.

Sales of building brick during 1938 totalled 148,807 thousand, valued at \$2,341,443. Sewer pipe shipments aggregated \$778,107; hollow blocks, roofing and floor tile, \$611,942; drain tile, \$322,744 and pottery, including earthenware, \$235,890. Production of bentonite in 1938 amounted to 1,179 short tons, valued at \$3,659, of which 1,136 tons came from deposits located

in Alberta and 43 tons from British Columbia. Fireclay was mined in Nova Scotia, New Brunswick, Saskatchewan and British Columbia and sales of this material totalled 2,344 short tons, valued at \$17,243, compared with 4,123 short tons at \$26,081 in 1937. Firebrick made from Canadian clays in 1938 numbered 2,213 thousand, worth \$113,581.

The number of firms reported as active in the Canadian domestic clay products industry totalled 145 in 1938, of which 84 were located in Ontario, 19 in Quebec, 12 in British Columbia, 10 in Alberta and the balance in Nova Scotia, New Brunswick, Saskatchewan and Manitoba. Capital employed by the industry as a whole was reported at \$18,068,542; employees numbered 2,242 and salaries and wages paid amounted to \$2,110,233. Fuel and electricity used during the year were valued at \$939,190 and chemicals and various other process supplies consumed were appraised at \$114,659.

The following information relating to Canadian clays is from a report prepared by the Bureau of Mines, Ottawa "Common clays suitable for the production of building brick and tile are found in all the provinces of Canada. The largest producing area in Canada of stoneware clays or semi-fireclays lies in the vicinity of Eastend and Willows in Saskatchewan; stoneware clays and moderately refractory fireclays occur near Shubenacadie and Musquodoboit, Nova Scotia. Stoneware clays, or low-grade fireclays, are also known to occur near Williams Lake, Quesnel and Chimney Creek Bridge in British Columbia; in the Cypress Hills of Alberta; and near Swan River, Manitoba. Fireclay refractories are manufactured from domestic clay at two large and a few small plants in Canada; near Vancouver, B.C., a high grade, moderately plastic fireclay is obtained by underground mining from the clay beds in the Sumas mountains. At another plant at Claybank, Saskatchewan, the highly plastic refractory clays recovered by selective mining from the "white mud" beds of Southern Saskatchewan are used. Small quantities of the most refractory clay in the deposits near Shubenacadie, N.S., are mined for refractory use and the Musquodoboit clay is utilized to some extent for the production of stove linings.

"China clay has been produced commercially in Canada only from the vicinity of St. Remi d'Amherst, Papineau County, Quebec. Important deposits of high-grade plastic white burning clays, and buff-burning clays, occur on the Mattagami, Abitibi, and Missinaibi Rivers in Northern Ontario; some may be classed as china clays, some as fireclays and others as ball clays. They have attracted considerable interest but have not yet been developed commercially, owing to their remoteness from industrial centres, and to a lack of transportation facilities. In British Columbia, along the Fraser River, about 25 miles above Prince George, is an extensive deposit of high-grade clay, parts of which yield a grade of china clay comparing favourably with the best found on this continent. Ball clays of high bond strength occur in the white mud beds of southern Saskatchewan."

Imports into Canada of clays and various clay products in 1938 were appraised at \$7,657,202 compared with \$9,108,976 in 1937; of the 1938 imports those from the United Kingdom were valued at \$4,050,397 and those from the United States at \$3,064,904. Included in the 1938 imports were 37,940 tons of china clay valued at \$324,933; 54,175 tons of fireclay at \$181,221; other clays, \$211,586; pottery and chinaware, \$4,043,852 and firebrick (other than chrome and magnesite) \$1,057,649. The value of clay products exported from Canada in 1938 was \$546,005, of which \$456,897 represented porcelain insulators.

Table 339.—Production of Clay Products in Canada from Domestic Clays, by Provinces, 1929-1938 (Gross Values)

Year	Nova Scotia	New Brunswick	Quebec	Ontario	Manitoba	Saskat- chewan	Alberta	British Columbia	Canada
	\$	\$	\$	\$	\$	\$	\$	\$	\$
1929.....	653,157	160,006	3,187,702	6,830,162	362,240	502,522	1,342,427	866,427	13,904,643
1930.....	495,333	162,536	2,464,044	5,221,214	215,967	349,283	997,685	687,516	10,593,578
1931.....	467,126	143,348	2,360,908	3,552,800	122,628	166,257	529,716	498,505	7,841,288
1932.....	172,557	68,151	1,064,551	1,639,508	49,773	109,739	329,584	216,355	3,650,218
1933.....	125,500	46,917	580,088	1,024,579	20,966	92,207	198,373	174,205	2,262,835
1934.....	157,158	59,897	632,322	1,261,006	37,916	90,997	246,677	194,437	2,680,410
1935.....	270,478	62,478	593,162	1,370,225	74,755	98,150	326,679	216,636	3,012,563
1936.....	355,254	102,256	691,765	1,573,936	55,564	95,584	315,777	280,891	3,471,027
1937.....	406,846	123,876	1,053,153	2,033,845	95,531	115,330	338,638	349,640	4,516,859
1938.....	340,253	123,625	1,022,194	2,083,496	105,334	118,713	377,337	365,132	4,536,084

Table 340.—Production (Sales) of Domestic Clay and Clay Products in Canada, 1937 and 1938

Products	Unit of measure	Sales or shipments			
		1937		1938	
		Quantity	\$	Quantity	\$
Clay—Fullers' earth.....	ton				
Bentonite.....	ton	163	1,971	1,179	3,659
Fireclay.....	ton	4,123	26,081	2,344	17,243
Kaolin (china clay).....	ton				
Other clay.....	ton			13,797	18,053
Fireclay blocks and shapes.....	\$		75,431		73,512
Firebrick.....	M	2,950	142,827	2,213	113,581
Brick—Soft mud process—Face.....	M	9,904	175,544	10,838	208,610
Common.....	M	23,636	316,534	24,104	313,082
Stiff mud process—Face.....	M	37,610	735,615	34,179	671,471
(wire cut) Common.....	M	55,689	765,630	50,734	681,744
Dry press —Face.....	M	12,565	233,542	13,125	266,039
Common.....	M	14,136	152,662	15,536	192,741
Fancy or ornamental brick (including special shapes, embossed and enamelled brick).....	M	55	2,972	63	4,175
Sewer brick.....	M	175	2,777	228	3,581
Paving brick.....	M	3	131	1	34
Structural tile—					
Hollow blocks (including fireproofing and load-bearing tile).....	ton	64,526	533,843	70,648	591,416
Roofing tile.....	No.	60,542	3,302	150,504	5,196
Floor tile (quarries).....	Sq. ft.	73,191	12,169	100,958	15,330
Ceramic or glazed floor and wall tile.....	\$				
Drain tile.....	M	11,391	298,970	12,862	322,774
Sewer pipe (including copings, flue linings, etc.) (b).....	\$		790,210		778,107
Pottery, glazed or unglazed (including coarse earthenware, stoneware, flower pots, and all other pottery).....	\$		232,209		235,890
Other products.....	\$		24,439		19,846
Total	\$		4,516,859		4,536,084

(b) Includes value of clay conduits.

Note.—In addition to the clays recorded in this table, there were 195,877 tons of ordinary clay consumed in Canada during 1937 in the production of Portland cement; the corresponding consumption in 1938 was 143,421 short tons. Also consumed by the Canadian cement industry in 1938 were 13,821 short tons of shale.

Table 341.—Production of Building Brick in Canada, 1929-1938

		Soft mud process		Stiff mud process (wire cut)		Dry press		Fancy or ornamental brick	Sewer brick	Total
		Face	Common	Face	Common	Face	Common			
1929.....	M	26,624	77,399	114,093	170,840	38,591	26,131	187	4,765	458,630
	\$	538,096	1,195,511	2,469,417	2,509,451	813,461	368,039	12,795	96,588	8,003,358
1930.....	M	11,350	56,487	99,284	105,225	29,434	16,915	339	804	319,838
	\$	247,220	861,805	2,135,871	1,480,965	604,197	208,495	27,649	15,299	5,581,501
1931.....	M	5,476	41,177	77,135	81,980	20,149	8,688	335	2,253	237,143
	\$	116,316	619,357	1,752,947	1,205,464	423,357	107,218	20,773	43,692	4,289,119
1932.....	M	6,188	12,801	30,197	40,753	5,522	4,248	125	643	100,477
	\$	108,582	182,372	664,756	638,922	119,547	46,762	6,237	12,156	1,779,334
1933.....	M	2,482	12,389	19,602	23,894	4,844	3,916	630	243	67,700
	\$	41,737	156,769	412,367	356,498	101,252	44,377	7,824	3,693	1,124,517
1934.....	M	4,904	14,256	23,800	30,317	6,005	6,440	43	307	86,072
	\$	76,247	183,585	494,341	424,131	130,392	66,616	2,625	5,902	1,383,929
1935.....	M	6,695	21,197	25,289	32,334	8,454	6,381	13	175	100,338
	\$	122,215	259,504	500,066	437,123	175,042	55,253	728	5,236	1,555,167
1936.....	M	5,097	24,180	30,213	35,592	8,961	10,241	25	418	115,732
	\$	111,378	302,490	575,765	484,078	165,924	100,785	1,374	6,778	1,748,772
1937.....	M	9,904	23,636	37,610	55,689	12,565	14,136	55	175	153,770
	\$	175,544	316,534	735,615	755,630	233,542	152,662	2,972	2,777	2,375,276
1938.....	M	10,838	24,104	34,179	50,734	13,125	15,536	63	228	148,807
	\$	208,610	313,082	671,471	681,744	266,039	192,741	4,175	3,581	2,341,443

Table 342.—Production of Building Brick in Canada—Per Capita of Population for Years Specified

Year	M per capita	Year	M per capita
1905.....	0-087	1933.....	0-006
1914.....	0-070	1934.....	0-008
1924.....	0-035	1935.....	0-009
1929.....	0-046	1936.....	0-010
1930.....	0-031	1937.....	0-014
1932.....	0-010	1938.....	0-013

Table 343.—Production of Paving Brick in Canada, 1929-1938

Year	Quantity	Value
	M	\$
1929.....	97	3,844
1930.....	9	297
1931.....	19	682
1932.....	6	155
1933.....	1	42
1934.....	10	382
1935.....	15	627
1936.....	116	3,149
1937.....	3	131
1938.....	1	34

Table 344.—Production of Structural Tile in Canada, 1929-1938

Year	Hollow Blocks(*)		Roofing Tile		Floor Tile (Quarries)	
	Short tons	\$	No.	\$	Sq. ft.	\$
1929.....	221,800	2,214,384	35,075	4,628	307,400	70,186
1930.....	165,359	1,667,783	3,056	356	179,786	56,230
1931.....	105,635	1,046,634	6,935	720	107,499	31,415
1932.....	48,118	421,672	48,939	3,900	94,316	21,502
1933.....	26,747	160,059	20,469	1,136	91,495	14,297
1934.....	31,136	244,122	44,115	1,852	80,356	17,491
1935.....	(a) 47,195	344,608	82,015	3,669	51,765	7,629
1936.....	58,501	467,860	52,730	2,139	97,738	13,798
1937.....	64,526	533,843	60,542	3,302	73,191	12,169
1938.....	70,648	591,416	150,504	5,196	100,958	15,330

(*) Including fireproofing and load-bearing tile.

(a) In addition, there was produced \$615 worth of ceramic tile.

Table 345.—Production of Sewer Pipe, Copings, Flue Linings, etc., in Canada, 1929-1938

Year	Value	Year	Value
	\$		\$
1929.....	2,005,887	1934.....	436,433
1930.....	1,721,815	1935.....	481,559
1931.....	1,508,803	1936.....	588,485
1932.....	813,224	1937.....	790,210
1933.....	354,458	1938.....	778,107

Table 346.—Production of Drain Tile in Canada, 1929-1938

Year	Quantity	Value	Year	Quantity	Value
	M	\$		M	\$
1929.....	25,000	720,316	1934.....	7,325	180,553
1930.....	25,291	687,070	1935.....	7,124	205,336
1931.....	12,518	328,410	1936.....	8,148	214,590
1932.....	7,385	186,670	1937.....	11,391	298,970
1933.....	10,057	222,829	1938.....	12,862	322,774

Table 347.—Production of Pottery† from Domestic Clays in Canada, 1929-1938

Year	Value	Year	Value
	\$		\$
1929.....	323,194	1934.....	223,733
1930.....	294,866	1935.....	220,711
1931.....	257,125	1936.....	218,402
1932.....	244,861	1937.....	232,209
1933.....	202,500	1938.....	235,890

† Including coarse earthenware, stoneware, flower pots, and all other pottery.

Table 348.—Production of Kaolin* and Fireclay in Canada, 1929-1938

Year	Kaolin		Fireclay		Year	Kaolin		Fireclay	
	Quantity	Value	Quantity	Value		Quantity	Value	Quantity	Value
	Tons	\$	Tons	\$		Tons	\$	Tons	\$
1929.....			5,041	35,226	1934.....	48	504	1,043	12,598
1930.....			2,870	25,975	1935.....	170	1,520	2,272	15,574
1931.....			1,233	14,857	1936.....			2,437	17,639
1932.....			990	11,826	1937.....			4,123	26,081
1933.....			1,421	11,273	1938.....			2,344	17,243

* Produced in province of Quebec.

Table 349.—Production of Firebrick and Fireclay Blocks and Shapes in Canada, from Domestic Clays, 1929-1938

Year	Firebrick		Fireclay blocks and shapes	Year	Firebrick		Fireclay blocks and shapes
	Quantity	Value	Value		Quantity	Value	Value
	M	\$	\$		M	\$	\$
1929.....	5,196	251,043	180,411	1934.....	2,109	101,219	62,388
1930.....	3,789	177,608	147,309	1935.....	1,817	90,149	71,344
1931.....	2,248	107,597	83,039	1936.....	2,538	118,923	65,171
1932.....	1,580	71,757	75,209	1937.....	2,950	142,827	75,431
1933.....	1,547	73,226	80,625	1938.....	2,213	113,581	73,512

Table 350.—Production (Sales) of Bentonite in Canada, 1930-1938

Year	Bentonite (*)	
	Tons	\$
1930.....	74	1,396
1931.....	187	935
1932.....	7	176
1933.....	55	1,363
1934.....	63	1,578
1935.....	41	781
1936.....	(a) 120	180
1937.....	163	1,971
1938.....	1,179	3,659

(*) All from British Columbia 1930-1936 inclusive; 1937 includes 132 tons at \$1,154 produced in Manitoba and 31 tons at \$817 in British Columbia. In 1938 Alberta production 1,136 tons, British Columbia 43 tons.

(a) Partly for experimental purposes.

It was reported in 1938 that bentonite films may be processed to afford a successful substitute for mica in various important uses and may come on the market as insulating tapes for wrapping wires and telephone cables. The films are said to be fireproof, waterproof, chemically inert, transparent, flexible and fairly tough and their employment for a variety of uses where dielectric properties are not required is suggested.

Table 351.—Fuller's Earth Used in Canada in the Manufacture of Soaps and Washing Compounds and in the Petroleum Products Industry, 1930-1938

Year	Petroleum Products Industry		Soaps and Washing Compounds	
	Pounds (*)	\$	Pounds	\$
1930.....	20,102,387	241,793	Data not available	
1931.....	16,157,582	201,361	492,174	6,264
1932.....	19,642,179	258,934	507,807	7,444
1933.....	22,811,655	314,515	588,434	8,501
1934.....	18,588,514	239,357	508,316	6,562
1935.....	18,487,145	260,885	660,018	13,694
1936.....	18,907,295	243,164	1,328,219	20,601
1937.....	18,843,458	240,309	1,167,768	20,393
1938.....	19,687,467	281,668	1,195,208	19,575

(*) Includes all clay.

The United States Bureau of Mines report that International trade in Fuller's earth is confined largely to the exports of American earth to mineral-oil refineries and of English earth to refineries treating edible oils and mineral fats. Experiments with bauxite for decolorizing oils by percolation processes began in 1937, and at least three companies in the United States are now offering it as a substitute for Fuller's earth.

With the opening up of new clay deposits, the use of the United States clays for treating edible products increased until 1938, when shipments to vegetable and animal oil refineries also decreased sharply, probably because of competition from artificially activated or acid-treated earths. Activated material is now made in California and Mississippi from bentonites having virtually no decolorizing power in the raw state.

Table 352.—China Clay (Kaolin) Used in the Manufacture of Paper in Canada, 1930-1938

Year	Tons	Value	Year	Tons	Value
		\$			\$
1930.....	13,024	218,423	1935.....	33,766	442,584
1931.....	11,484	173,660	1936.....	39,165	520,121
1932.....	14,432	205,068	1937.....	41,738	578,223
1933.....	20,048	267,014	1938.....	34,968	488,147
1934.....	27,550	357,286			

Table 353.—Clays and Earths Used in Canadian Rubber Industry, 1933-1938

Year	Tons	Value	Year	Tons	Value ^a
		\$			\$
1933.....	1,391	32,361	1936.....	3,017	70,709
1934.....	2,391	54,368	1937.....	3,614	79,300
1935.....	2,639	63,553	1938.....	2,942	81,935

Table 354.—Fuller's and Infusorial Earth Used in Specified Canadian Industries, 1932-1938

Year	Sugar Refineries		Vegetable Oil Mills	
	Pounds	\$	Pounds	\$
1932.....	(a)	(a)	102,650	1,773
1933.....	(a)	(a)	126,880	2,730
1934.....	(a)	(a)	115,120	2,171
1935.....	(a)	(a)	88,980	2,425
1936.....	(b) 59,200	1,730	243,720	10,044
1937.....	(c) 4,586,786	95,532	(†) 212,997	9,349
1938.....	(c) 4,908,597	101,473	190,253	9,063

(a) Not recorded. (b) Fuller's earth. (c) Infusorial earth. (†) Includes other earth.

NOTE.—In addition to the consumption recorded, there is a considerable quantity of fuller's earth used in the slaughtering industry.

Table 355.—Firebrick and Fireclay Used in the Manufacture of Iron and Steel and Their Products in Canada, 1931-1938

Year	Firebrick		Fireclay		Other fireclay, firebrick and cupola blocks
	Number	Value	Number	Value	
		\$		\$	\$
1931.....	4,326,000	197,684	7,631	64,300	45,393
1932.....	3,409,000	123,532	5,910	52,492	36,395
1933.....	1,846,016	141,784	7,615	62,602	(b) 11,628
1934.....	2,590,452	192,538	8,248	75,906	21,488
1935.....	(a)	451,604	11,510	101,601	28,064
1936.....	(a)	(a)	(c) \$ 779,014	(a)	(a)
1937.....	(a)	(a)	(c) \$1,058,787	(a)	(a)
1938.....	(a)	(a)	(c) \$ 838,012	(a)	(a)

(a) Not published separately.

(b) From 1933 includes only cupola blocks.

(c) Combined value for firebrick, fireclay and other fireclay, etc.

Table 356.—Imports into Canada and Exports of Clay and Clay Products, 1937 and 1938

	1937		1938	
	Quantity	\$	Quantity	\$
IMPORTS				
Building brick.....ton	1,477	18,485	1,801	22,075
Building blocks and fireproofing tile.....\$		17,121		48,310
Clays—China.....cwt.	1,103,891	445,073	758,794	324,933
Fire.....cwt.	1,590,207	250,393	1,083,493	181,221
Pipe.....\$		4,910		7,999
Other clays, n.o.p.....\$		224,160		203,587
Zirconium silicate.....\$		2,065		1,847
Zirconium oxide.....\$		32,668		24,983
Drain tile, unglazed.....\$		2,705		54
Drain, sewer pipe and earthenware fittings therefor, chimney linings or vents, chimney tops or inverted blocks, glazed or unglazed, n.o.p.....\$				
.....\$		20,322		12,950
Tiles or blocks of earthenware or stone prepared for mosaic flooring.....\$		44,869		53,223
Tiles, earthenware, for roofing purposes.....\$		13,621		3,152
Tiles, earthenware, n.o.p.....\$		138,033		131,990
Insulators, electric, porcelain.....\$		113,103		88,344
Pottery and chinaware.....\$		4,170,558		4,043,852
Brick, fire, other, valued at not less than \$100 per M, rectangular shaped; the dimensions of each not to exceed 125 cubic inches; for use exclusively in the construction or repair of a furnace, kiln, etc.....\$				
.....\$		143,160		69,440
Brick, fire, n.o.p., for use exclusively in the construction or repair of a furnace, kiln or other equipment of a manufacturing establishment (not made in Canada).....\$				
.....\$		449,301		321,850
Firebrick, n.o.p.....\$		989,603		666,359
Firebricks, chrome.....\$		103,287		47,885
Magnesite brick (fire).....\$		653,507		571,910
Silica brick (containing not less than 90 per cent silica).....\$		539,253		240,184
Paving brick.....ton	1,615	13,547	1,695	12,798
Artificial teeth, not mounted.....\$		387,024		365,063
Baths, bathtubs, basins, laundry tubs, etc., of earthenware, cement or clay, n.o.p.....\$				
.....\$		151,264		119,164
Saggars (a).....\$		4,646		2,364
Crucibles, clay or sand.....\$		38,839		29,139
Other manufactures of clay, n.o.p.....\$		137,460		62,526
Total\$		9,103,976		7,657,202
From—United Kingdom.....\$		4,166,926		4,050,397
United States.....\$		4,217,650		3,064,904
EXPORTS				
Building brick.....M	1,155	20,972	1,134	17,544
Clay—Unmanufactured.....cwt.	1,320	3,111	910	2,652
Manufactures of.....\$		69,505		53,104
Earthenware.....\$		60,565		15,808
Porcelain insulators.....\$		442,817		456,897
Total\$		596,970		546,005

(a) From February 26, 1937.

Cwt.=100 pounds.

Ton=2,000 pounds.

PRICES (a)

Bentonite—per ton, carload lots, f.o.b. Wyoming mines, dried and crushed, in bulk, \$8; in bags, \$10 f.o.b. Chicago, selected air-floated, \$25.

China Clay (Kaolin)—per ton, f.o.b. South Carolina and Georgia mines, in bulk: saggar clays, \$2.50 to \$3.50; tailings, \$4.50 to \$5.00. No. 2 grades, \$5.50 to \$6.00; No. 1 grades, air-floated, crude, \$6.75 to \$8.00; No. 1 washed, \$8.00. Florida: washed, crushed, \$11.75; air-floated and washed, \$14 to \$15. Maryland: ball clays, shredded bulk, \$3.75 to \$8.25; air-floated, in paper bags, \$15 to \$18.25. New Jersey: Plastic kaolin, pulverized, in paper bags, \$10. Insecticide clay, \$11.50 to \$16.50. Imported English, per long ton, C. and F. American ports: lump, \$20.00 to \$25.00 in bulk; air-floated, \$35 to \$60.

Fuller's Earth—per ton, f.o.b. Colorado, \$9. f.o.b. Georgia or Florida, 30 to 60 mesh, \$14.50; 15 to 30, \$14; 200 and up, \$10; 100 and up, \$7.

(b) **Fuller's Earth**—English, carlots, tons, to \$29.00; Georgian, carlots—to \$21.00.

(c) **China Clay**—Imported, car lots—bulk—ton \$20.00 to \$25.00. Pigment clay for rubber—car lots—bags—ton—\$20.00 to \$25.00, less car lots, to \$23.

Kaolin (refined grades) lb. 4 cents—12 cents.

(a) Engineering and Mining Journal's "Metal and Mineral Markets"—New York, December, 1939.

(b) "Canadian Chemistry and Metallurgy"—Toronto, November, 1939.

Table 357.—World's Production of China Clay, 1937 and 1938

(Taken from the Imperial Institute's publication—The Mineral Industry of the British Empire and Foreign Countries)

(Long tons)

Producing Country and Description	1937	1938	Producing Country and Description	1937	1938
BRITISH EMPIRE			FOREIGN COUNTRIES—CON.		
United Kingdom.....	830,946	585,888	Thuringia—		
Union of South Africa.....	413	798	Sand.....	6,392	(a)
Burma.....	(a) 263	(a) 385	Greece.....	300	(a)
Federated Malay States.....	17,081	26,106	Italy—		
India.....	30	768	Crude.....	96,094	73,772
Unfederated Malay States.....	16,688	(a)	Washed.....	37,159	43,630
Australia.....			Portugal—		
FOREIGN COUNTRIES			Washed.....	10,723	11,768
Austria.....	(b) 19,537	(d)	Kaolinic sand.....	453	189
Belgium (c).....	22,538	(a)	Roumania (e).....	600	(a)
Bulgaria.....	3,492	7,663	Sweden.....	2,148	(a)
Czechoslovakia (estimated).....	450,000	400,000	Algeria.....	1,634	(a)
Denmark—			United States (f).....	653,823	531,298
Crude.....	32,300	37,400	Argentina.....	711	(a)
Washed and pressed.....	9,100	9,750	Brazil.....	1,593	(a)
France.....	124,450	(a)	Chile.....	(a)	(a)
Germany—			Japan (estimated).....	400,000	400,000
Bavaria.....	157,265	(a)	Korea.....	(a)	(a)
Prussia.....	90,521	(a)	Manchuria.....	(a)	(a)
Saxony—			Netherlands East Indies.....	771	(a)
Crude.....	47,653	(a)			
Washed.....	59,892	(a)			

China clay is also produced in U.S.S.R. and China.

(a) Information not available.

(c) "Eurite" and kaolin.

(e) Converted from cubic metres at the rate of 1 cubic metre=2 long tons.

(b) Exports.

(d) Comparable exports not available.

(f) Sales of china clay and paper clay.

Table 358.—Sales and Cost Statistics, by Provinces, Domestic Clay Products Industry, 1935-1938

Province and year	Number of firms	Cost of process supplies used	Cost of fuel and electricity	Net value of sales
		\$	\$	\$
NOVA SCOTIA—				
1935.....	5	906	50,264	219,308
1936.....	5	603	58,773	295,878
1937.....	5	2,514	73,200	331,132
1938.....	5	2,948	64,121	273,184
NEW BRUNSWICK—				
1935.....	4	345	10,523	51,610
1936.....	5	480	20,652	81,124
1937.....	5	1,209	26,710	95,957
1938.....	5	2,069	25,409	96,147
QUEBEC—				
1935.....	22	29,978	141,901	421,283
1936.....	19	15,967	169,803	505,995
1937.....	19	23,776	247,074	782,303
1938.....	19	33,030	235,148	754,016
ONTARIO—				
1935.....	75	25,789	339,248	1,005,188
1936.....	80	46,924	357,874	1,169,138
1937.....	78	66,738	571,058	1,396,049
1938.....	84	66,691	493,118	1,523,687
MANITOBA—				
1935.....	4	125	17,700	56,930
1936.....	4	667	8,813	46,084
1937.....	5	390	14,348	80,793
1938.....	4	460	23,278	81,596
SASKATCHEWAN—				
1935.....	4	673	10,472	87,005
1936.....	3	776	11,429	83,379
1937.....	5	1,157	13,419	100,754
1938.....	6	824	10,882	107,007

Table 358.—Sales and Cost Statistics, by Provinces, Domestic Clay Products Industry, 1935-1938—Conc.

Province and year	Number of firms	Cost of process supplies used	Cost of fuel and electricity	Net value of sales
		\$	\$	\$
ALBERTA—				
1935.....	9	2,201	17,027	307,451
1936.....	9	3,533	27,973	284,271
1937.....	10	3,103	30,919	304,616
1938.....	10	2,267	25,891	349,179
BRITISH COLUMBIA—				
1935.....	9	566	31,860	184,210
1936.....	8	2,403	39,684	238,804
1937.....	10	4,681	56,027	288,932
1938.....	12	6,370	61,343	297,419
Canada—				
1935.....	132	60,583	618,995	2,332,985
1936.....	133	71,353	695,001	2,704,673
1937.....	137	103,568	1,032,755	3,380,536
1938.....	145	114,659	939,190	3,482,235
1926.....	194	(a)	2,080,054	(a)

(a) Information not available.

Table 359.—Capital Employed in the Clay Products Industry in Canada, by Provinces, 1938

Industry and province	Capital employed as represented by:					Total
	Present value of land†	Present value of buildings, fixtures, machinery, tools and other equipment	Inventory value of materials on hand, stocks in process, fuel, etc.	Inventory value of finished products on hand	Operating capital, including cash, bills and accounts receivable, etc.	
	\$	\$	\$	\$	\$	\$
BY INDUSTRIES—						
*Brick and Tile—						
Nova Scotia.....	117,214	594,553	70,969	81,691	64,506	928,933
New Brunswick.....	126,787	55,223	17,679	12,022	8,413	219,124
Quebec.....	616,194	3,207,734	35,350	411,875	307,887	4,579,040
Ontario.....	1,449,051	4,471,126	250,481	754,566	1,355,294	8,280,518
Manitoba.....	15,851	142,168	3,725	26,409	70,381	258,534
Saskatchewan.....	318,579	407,390	5,299	47,500	47,200	825,968
Alberta.....	141,159	1,280,804	75,732	170,714	77,246	1,745,655
British Columbia.....	144,743	515,389	16,755	133,052	109,021	918,960
Total for Canada.....	2,928,578	10,674,387	475,990	1,637,829	2,039,948	17,756,732
Stoneware and pottery—						
Total for Canada.....	40,063	154,929	27,121	40,647	49,050	311,810
BY PROVINCES—						
Total for clay and clay products—						
Nova Scotia.....	117,214	594,553	70,969	81,691	64,506	928,933
New Brunswick.....	126,787	63,223	20,679	18,022	24,413	253,124
Quebec.....	616,194	3,207,734	35,350	411,875	307,887	4,579,040
Ontario.....	1,464,636	4,495,326	252,968	761,704	1,374,658	8,349,292
Manitoba.....	15,851	142,168	3,725	26,409	70,381	258,534
Saskatchewan.....	318,579	407,390	5,299	47,500	47,200	825,968
Alberta.....	164,137	1,396,533	96,866	195,023	89,432	1,941,991
British Columbia.....	145,243	522,389	17,255	136,252	110,521	931,660
Canada.....	2,968,641	10,829,316	503,111	1,678,476	2,088,998	18,068,542

* Clay, sewer pipe, firebrick products and other clays included under brick and tile.

† Excluding unmined material.

Table 360.—Employees, Salaries and Wages in the Clay Products Industry in Canada, by Provinces, 1938

Province	*Average number of employees			Salaries and wages		
	Salaried employees	Wage-earners	Total	Salaries	Wages	Total
1938				\$	\$	\$
Nova Scotia.....	11	135	146	31,023	105,420	136,443
New Brunswick.....	9	71	80	11,060	44,607	55,667
Quebec.....	66	425	491	120,752	337,985	458,737
Ontario.....	114	842	956	218,902	686,530	905,432
Manitoba.....	8	60	68	15,960	40,415	56,375
Saskatchewan.....	8	25	33	16,370	22,531	38,901
Alberta.....	44	225	269	78,259	183,715	261,974
British Columbia.....	18	181	199	33,176	163,528	196,704
Canada.....	278	1,964	2,242	525,502	1,584,731	2,110,233

* See note page 65.

† Includes 26 female salaried workers.

Table 361.—Average Number of Wage-Earners, by Months, 1937 and 1938

Month	1937	1938	
		Pit	Plant
January.....	891	50	843
February.....	919	54	769
March.....	1,150	51	890
April.....	1,540	127	1,434
May.....	2,434	325	2,242
June.....	2,827	393	2,547
July.....	2,888	337	2,500
August.....	2,938	292	2,346
September.....	2,661	267	2,286
October.....	2,438	224	1,955
November.....	2,011	142	1,695
December.....	1,481	89	1,412

2. Products from Imported Clays

This industry covers the operations of the factories in Canada which were occupied chiefly in making ceramic products from imported clays. The commodities made in these plants during 1938 included high tension insulators, enamelled sanitary ware, china tableware, firebrick, floor and wall tile, refractory cements, pottery, and electrical porcelains such as sockets, plugs, etc.

Twenty-one plants reported in this group during 1938 and their output was valued at \$3,048,888, against last year's total of \$3,599,181 and the 1936 total of \$2,906,432. Capital employed amounted to \$4,690,306 and the average number of workers was 1,163. Salaries and wages amounted to \$1,194,509, fuel and electricity cost \$229,517 and materials for use in manufacturing processes cost \$795,956.

Table 362.—Products Made in the Imported-Clay Products Industry, 1937 and 1938

Products	1937	1938
	Gross selling value at works	Gross selling value at works
	\$	\$
Firebrick and stove linings—Rigid.....	395,155	271,711
Plastic.....	80,134	83,736
High temperature cements.....	35,219	36,040
High tension porcelain insulators, china sanitary ware, clay sewer pipe, floor and wall tile, pottery, china tableware, etc.....	3,088,673	2,657,401
(Separate figures cannot be shown for these items as there were only one or two producers in each case.)		
Total.....	3,599,181	3,048,888

NOTE.—Clay firebrick, floor tile, sewer pipe and pottery are also made in Canada from domestic clays (see Tables 345 and 349).

Table 363.—Materials Used in the Imported-Clay Products Industry, 1937 and 1938

Material	1937		1938	
	Short tons	Total cost at works	Short tons	Total cost at works
Imported clays—Ball clay.....	3,701	\$ 62,119	2,531	\$ 46,766
China clay.....	3,321	66,361	2,573	52,927
Fireclay.....	26,242	151,932	20,717	118,875
Saggar clay.....	918	9,096	462	4,376
Other imported clays.....	1,704	14,175	640	7,517
Canadian clays—Fireclay.....	2,692	3,870	202	1,879
Other clay.....			3,491	2,699
Feldspar.....	2,428	46,068	1,890	35,979
Silica and ground quartz.....	3,032	44,648	2,576	38,441
Talc.....	110	1,460	160	2,119
Other glazing materials.....		17,461		15,793
Insulator hardware.....		263,093		219,367
Shipping containers and packing materials.....		73,510		75,186
All other materials.....		217,704		174,032
Total.....		971,497		795,956

LIME

Production of quick and hydrated lime in Canada during 1938 totalled 486,922 short tons valued at \$3,542,652 compared with 549,353 short tons at \$3,824,917 in 1937. The 1938 output comprised 415,761 short tons of quick lime valued at \$2,953,091 and 71,161 short tons of hydrated lime worth \$589,561. During the year under review, 373,278 tons of quick lime and 30,547 tons of hydrated lime were sold or used by lime producers for chemical purposes while the balance of Canadian lime production, totalling 83,097 tons and consisting of both quick and hydrated was sold or used for building, agricultural and other purposes.

Stone used in the production of lime in Canada included calcium, high calcium and dolomitic varieties of limestone. It is estimated that nearly 900,000 tons of limestone was used in the production of lime in 1938. Lime was produced in all Canadian provinces in 1938 with the exception of Prince Edward Island and Saskatchewan; no commercial production was reported in the Territories. Of the total Canadian output of lime in 1938, Ontario plants produced 270,478 tons or 55·5 per cent and Quebec 137,314 tons or 28·2 per cent. Imports of lime into Canada in 1938 came entirely from the United States and totalled 6,652 short tons valued at \$36,248; exports of lime during the same period amounted to 6,381 tons at \$51,346.

During 1938 the industry reported 53 plants as active, capital employed totalled \$4,881,214 and \$795,068 in salaries and wages were distributed to 867 employees. The cost of fuels and purchased electricity used amounted to \$826,230 and the value of explosives, chemicals and other process supplies consumed aggregated \$113,759.

The following information relating to Canadian lime production is from a report issued recently by the Department of Mines and Resources, Ottawa:

"During 1938 natural gas was made available in the Beachville, Ontario, area and both of the large plants producing chemical lime at Beachville are now using it for fuel instead of coal.

"A large market for white, high-calcium lime has been opened up by the use of calcium carbonate filler instead of imported clay in newsprint and magazine paper. Its manufacture in Canada was begun in 1937. At present the paper companies using it purchase the quicklime and make the carbonate filler at their own plants. This filler also has other uses, and preparations to manufacture it in Canada, to supply these other uses, have been reported.

"Aged lime putty and lime mortar for use in building construction are now available in a number of Canadian cities. Lime mortar is coming back into favour as a binder in masonry, and sales of lime for construction may be expected to increase.

"There are many prospective lime-producing localities in Canada owing to the abundance of suitable limestone throughout the country, and considerable interest has been taken recently in deposits of high-calcium limestone in northern Ontario because of their proximity to mines and pulp mills.

"Lime is marketed in the form of quicklime and in the hydrated state, the latter being a specially prepared slaked lime in the form of fine powder and marketed in 50-pound, multi-wall paper bags. Quicklime, which comprises about 80 per cent of the total sales, is marketed in the lump, pebble, crushed, and pulverized forms; lump lime and pebble lime are sold either in bulk or packed in barrels; crushed lime (1-inch and under) and pulverized lime (ground to minus 20 mesh, and in some plants to minus 50 mesh) are sold in airtight, multi-wall paper bags. In these various forms lime finds a multitude of uses in chemical and metallurgical processes and in construction, agriculture, and other industries. Lime is one of the great basic raw materials for the chemical industry, and of the current production about 85 per cent is used in chemical processes, thus the old conception of lime as being primarily a structural material is no longer true.

"Prices of the various lime products vary over a wide range, depending on the geographical location of the plants and on differences in quality of the lime. There were no significant changes in prices of lime during 1938."

Table 364.—Production of Lime in Canada, 1929-1938

Year	Short tons	Value	Year	Short tons	Value
		\$			\$
1929.....	674,087	5,908,610	1934.....	368,113	2,745,797
1930.....	490,802	4,038,698	1935.....	405,419	2,925,791
1931.....	344,785	2,764,415	1936.....	468,401	3,335,970
1932.....	320,650	2,394,537	1937.....	549,353	3,824,917
1933.....	323,540	2,432,306	1938.....	486,922	3,542,652

Table 365.—Production of Lime in Canada, 1912-1921

Year	Short tons	Value	Year	Short tons	Value
		\$			\$
1912.....	296,654	1,844,849	1917.....	229,851	1,558,487
1913.....	264,547	1,609,398	1918.....	222,738	1,876,025
1914.....	246,000	1,360,628	1919.....	250,163	2,310,607
1915.....	176,654	1,015,702	1920.....	329,957	3,813,553
1916.....	192,246	1,091,463	1921.....	240,767	2,781,197

Imports of lime into Canada during 1912 were appraised at \$162,593 compared with \$53,745 in 1918. Exports of lime from Canada in 1912 were valued at \$35,097 as against \$70,930 in 1918.

Table 366.—Production of Lime in Canada, by Provinces, 1938, Showing Purposes for which Used (*) or Sold

	Nova Scotia and New Brunswick	Quebec	Ontario	Manitoba and Alberta	British Columbia	Canada
(1 ton=2,000 pounds)						
QUICKLIME						
Building trades—						
Finishing lime.....ton		10	2,600	2,122	250	4,982
.....\$		198	15,800	20,645	6,760	43,393
Masons' lime.....ton	685	5,780	4,539	1,467		12,471
.....\$	5,980	60,405	36,854	14,159		117,395
Sand-lime brick.....ton		1,316	5,048			6,364
.....\$		6,041	33,660			39,701
Agriculture.....ton	200	42			40	282
.....\$	2,160	303			160	2,623
Chemical—						
Smelters (non-ferrous).....ton			1,052	1,991		3,043
.....\$			5,672	19,905		25,577
Iron and steel mills (a).....ton	13,306	495	12,298	4,136	357	30,592
.....\$	118,932	3,793	86,936	33,088	3,497	246,246
Cyanide mills (gold mines).....ton	50	5,218	28,077	730	941	35,016
.....\$	500	39,517	179,761	8,285	9,218	237,281
Pulp and paper mills.....ton	5,520	60,474	6,652	7,061	7,686	87,393
.....\$	42,155	324,418	42,437	48,162	69,343	526,515

Table 366.—Production of Lime in Canada, by Provinces, 1938, Showing Purposes for which Used (*) or Sold—Concluded

	Nova Scotia and New Brunswick	Quebec	Ontario	Manitoba and Alberta	British Columbia	Canada
(1 ton—2,000 pounds)						
Chemical—Concluded						
Glass works..... ton			6,985	885		7,870
\$			46,223	6,197		52,420
Sugar refineries..... ton	250	34	5,577	7,734	15	13,619
\$	2,200	298	53,883	64,192	147	120,720
Tanneries..... ton		709	2,684			3,393
\$		5,271	18,529			23,800
Fertilizers..... ton			171			171
\$			1,211			1,211
Insecticides..... ton			864		96	960
\$			6,084		940	7,024
Other chemical works..... ton		30,946	160,154	130		191,230
\$		225,072	1,119,744	1,719		1,346,535
Uses unspecified..... ton	1,553	3,562	5,858	1,088	5,133	17,194
\$	12,424	33,205	44,921	12,333	50,292	153,175
Other consumers..... ton		1,120	70			1,190
\$		8,960	512			9,472
Total Quicklime..... ton	21,564	109,706	242,629	27,344	14,518	415,761
\$	184,351	707,481	1,692,227	228,685	140,347	2,953,091
HYDRATED LIME						
Building trades—						
Finishing lime..... ton			10,732	4,335		15,067
\$			120,306	73,553		193,859
Masons' lime..... ton	148	1,066	4,032			5,246
\$	1,480	13,753	32,520			47,759
Sand-lime brick..... ton						
\$						
Agriculture..... ton	660	685	1,533		2,980	5,858
\$	6,200	4,685	15,392		19,614	45,891
Chemical—						
Smelters (non-ferrous)..... ton		255	85		971	1,311
\$		1,590	1,055		6,391	9,036
Iron and steel mills..... ton		13,551	23			13,574
\$		40,653	245			40,898
Cyanide mills..... ton	25	1,210	223			1,458
\$	250	5,930	2,594			8,774
Pulp and paper mills..... ton	4,150	6,287	111			10,548
\$	29,560	35,684	1,100			66,284
Glass works..... ton						
\$						
Sugar refineries..... ton	20	96	15			131
\$	175	796	157			1,123
Tanneries..... ton		392	248			640
\$		2,989	2,684			5,673
Fertilizers..... ton		150	34			184
\$		900	354			1,254
Insecticides..... ton	402		30		35	467
\$	3,216		290		231	3,737
Other chemical works..... ton		927	1,109	198		2,234
\$		7,230	12,125	3,459		22,814
Uses unspecified..... ton	629	1,706	9,613		1,151	13,099
\$	5,032	14,509	107,471		7,578	134,590
Other consumers..... ton		1,283	61			1,344
\$		7,131	733			7,864
Total Hydrated Lime..... ton	6,034	27,608	27,849	4,533	5,137	71,161
\$	45,853	135,550	297,032	77,012	33,814	589,561
Grand Total..... ton	27,598	137,314	270,478	31,877	19,655	486,922
\$	230,204	842,331	1,989,259	305,697	171,161	3,542,652

(a) Includes calcined dolomite used as a refractory material.

(*) Not necessarily consumed in provinces where produced.

Table 367.—Lime Sold or Used for Chemical and Other Purposes and Value of Construction Contracts in Canada, 1930-1938

Year	Lime Sold or Used for Chemical Purposes		Lime Sold or Used for Building or Other Non-Chemical Purposes		Value of Construction Contracts awarded in Canada (a)
	short tons	\$	short tons	\$	\$
1930.....	351,442	2,566,112	139,359	1,442,586	456,999,600
1931.....	231,837	1,637,319	112,948	1,127,098	315,482,000
1932.....	255,472	1,758,898	65,178	635,639	132,872,400
1933.....	235,810	1,664,946	87,730	767,360	97,289,800
1934.....	229,906	1,568,906	138,207	1,146,891	125,811,500
1935.....	260,885	1,775,657	144,534	1,150,134	160,305,000
1936.....	389,324 (b)	2,670,266	79,077	665,704	162,588,000
1937.....	466,796 (c)	3,112,147	82,557	712,770	224,056,700
1938.....	403,825 (d)	2,746,927	83,097	795,725	187,277,900

(a) Compiled by McLean Building Reports Ltd.

(b) 349,940 short tons quicklime; 39,384 short tons hydrated lime.

(c) 421,867 tons quicklime and 44,929 short tons hydrated lime.

(d) 373,278 tons quicklime and 30,547 short tons hydrated lime.

Table 368.—Imports into Canada and Exports of Lime and Various Lime Compounds, 1937 and 1938

	1937		1938	
	Quantity	Value	Quantity	Value
		\$		\$
IMPORTS—				
Lime.....cwt.	100,331 (a)	32,379	(a) 133,050	36,248
Calcium chloride in packages of not less than 25 pounds.....lb.	823,900	7,134	383,900	4,121
Calcium chloride in packages of less than 25 pounds.....lb.	816	439	1,263	1,185
Calcium chloride, not in solution, for road treating purposes.....lb.	6,621,600	61,689	15,283,100	148,581
Calcium arsenate.....lb.	71,168	4,305	37,068	3,507
Chloride of lime and hypochlorite of lime in packages not less than 25 pounds.....lb.	627,000	26,625	345,100	22,566
Chloride of lime and hypochlorite of lime in packages of less than 25 pounds.....lb.	45,858	5,369	39,280	4,726
EXPORTS—				
Lime.....cwt.	202,987	85,089	127,615	51,346
Acetate of lime.....cwt.	34,415	48,906	41,208	44,910

(a) All from the United States.

Table 369.—Number of Firms, Employees, Salaries and Wages and Net Value of Lime (Quick and Hydrated) Sold or Used, by Provinces, 1938

Province	Number of firms	Number of employees		Salaries and wages	Fuel, electricity and process supplies used	Production
		Salaried employees	Wage-earners			Net value
1938				\$	\$	\$
New Brunswick(†).....	5	8	95	99,090	55,640	174,564
Quebec.....	19	30	287	253,422	282,127	561,204
Ontario.....	15	21	227	266,790	454,058	1,535,201
Manitoba.....	3	5	75	67,060	77,092	121,593
Alberta.....	3	3	20	28,990	26,128	80,884
British Columbia.....	3	10	86	79,716	44,944	129,217
Canada.....	48	77	790	795,068	939,989	2,602,663

† Includes data for two firms operating in Nova Scotia.

Table 370.—Capital Employed in the Lime Industry in Canada, by Provinces, 1938

Province	Capital employed as represented by:					Total
	Present cash value of land	Present value of buildings, fixtures, machinery, tools and other equipment	Inventory value of stone on hand, fuel and miscellaneous supplies on hand	Inventory value of finished products on hand	Operating capital (cash bills and accounts receivable, prepaid expenses, etc.)	
	\$	\$	\$	\$	\$	\$
New Brunswick*	69,587	115,300	13,210	7,913	29,795	235,805
Quebec	400,862	635,701	124,282	6,354	201,431	1,368,630
Ontario	204,738	1,771,144	181,318	15,052	24,813	2,197,065
Manitoba	(a)	505,597	28,376	8,808	3,000	545,781
Alberta	2,500	130,175	7,494	6,940	30,774	177,883
British Columbia	5,000	248,846	58,627	12,069	31,508	356,050
Canada	682,687	3,406,763	413,307	57,136	321,321	4,881,214

* Includes data for 2 firms in Nova Scotia.

(a) Not recorded.

Table 371.—Number of Wage-Earners in the Lime Industry on Payroll or Time Record on the 15th of Each Month or Nearest Representative Date, 1938

Month	Quarry	Kiln	Month	Quarry	Kiln
January	266	463	July	341	482
February	242	488	August	333	487
March	278	472	September	318	480
April	298	491	October	302	519
May	329	524	November	286	503
June	341	456	December	263	448

SAND AND GRAVEL

Commercial production of sand and gravel in Canada during 1938 totalled 32,223,882 short tons valued at \$12,002,554 compared with 27,001,301 short tons worth \$10,492,696 in 1937. The tonnage and value of these materials produced in 1938 established an all-time high record for the industry. Included in the totals for both 1937 and 1938 are sands and gravels derived from all sources, including recoveries by dredges and material used by railroads as ballast.

Of the total sand and gravel output in 1938 there were 22,513,256 tons used for concrete, roads, etc., and 2,359,703 tons as railway ballast. In addition, there were produced 1,750,187 tons of straight sand for building, etc.; 18,845 tons for moulding; 4,656 tons as core sand and 62,939 tons for other purposes. The quantity of crushed gravel produced during the year under review amounted to 2,661,973 tons and 1,852,323 tons of sand were employed as mine fill.

Quebec and Ontario are Canada's largest sand and gravel producing provinces, the output in these provinces in 1938 being, respectively, 12,523,404 and 8,531,281 short tons; in 1938 the quantity of material washed or screened at Canadian sand and gravel plants totalled 2,949,360 short tons compared with 3,522,387 short tons in 1937, while the quantity of bank or pit-run grades amounted to 29,274,522 short tons as against a corresponding tonnage of 23,478,914 in the preceding year.

Imports of sand and gravel n.o.p. into Canada in 1938 totalled 86,692 short tons worth \$62,485 compared with 132,460 short tons at \$97,607 in 1937; exports of these materials in 1938 amounted to 609,193 short tons valued at \$146,050 as against corresponding exports of 364,270 tons at \$78,441 in 1937.

Active firms in the Canadian sand and gravel industry numbered 1,339 in 1938, of which 861 were located in Quebec, 410 in Ontario, 21 in British Columbia and lesser numbers in Nova Scotia, New Brunswick, Manitoba, Saskatchewan and Alberta. Capital employed by the

industry totalled \$3,286,340; employees were reported at 6,959; salaries and wages paid totalled \$4,482,916; fuel, electricity and process supplies used aggregated \$254,595 and the total net value of production was estimated at \$11,747,959.

The Bureau of Mines, Ottawa, reports that most of the gravel used for road work comes from pits that are worked for that purpose. Usually enough gravel is extracted by a portable or semi-portable plant to supply the immediate needs, following which a sufficient reserve is built up, in the form of stock piles for two years' requirements. Thus, the output of gravel from year to year depends upon the extent of road construction and improvements. Railway pits may also remain idle for several years. Part of the gravel is crushed, screened, and in some cases even washed. Some of the provincial highway departments have been using crushed instead of pit-run gravel on their main highways for a number of years.

Most of the large commercial plants are equipped to produce crushed gravel, a product that can compete with crushed stone. Sand is used chiefly in the building industry, for which purpose it must be free from dust, loam, organic matter or clay, and contain but little silt. It is usually obtained from local deposits. Special grades of sand are used in foundries for moulding, in the filtering of water supply, and in glass making.

Table 372.—Production (*) of Sand and Gravel in Canada, 1929-1938

Year	Tons	\$	Year	Tons	\$
1929.....	27,846,945	7,317,814	1934.....	14,854,159	4,035,477
1930.....	28,547,511	8,344,913	1935.....	21,213,489	6,389,440
1931.....	21,748,586	6,651,165	1936.....	22,124,160	6,921,399
1932.....	14,469,942	4,480,596	1937.....	27,001,301	10,492,696
1933.....	11,738,823	4,464,285	1938.....	32,223,882	12,002,554

(*) Does not include production of natural silica sand or of silica sand manufactured from quartz or silica rock; production of these are recorded under quartz. Also does not include natural sand used for back filling at mines prior to 1936.

Table 373.—Production in Canada, Imports and Exports of Sand and Gravel, 1938

	Washed or Screened	Bank or Pit-run	Total Value
	Tons	Tons	\$
PRODUCTION(*)—			
Sand—			
Moulding sand.....	8,434	10,411	19,693
Building sand and sand for concrete, roadwork, etc.....	1,038,859	711,328	685,976
Core sand.....	4,528	128	5,612
Mine filling.....		1,852,323	256,380
Other sand (including blast sands, engine sands, etc.).....	12,885	50,054	17,297
Sand and gravel—			
Sand and gravel for railway ballast.....	246,485	2,113,218	443,936
Sand and gravel for concrete, roadbuilding, etc.....	1,812,136	21,201,120	9,101,882
Crushed gravel.....	326,033	3,335,940	1,471,773
Total.....	2,949,360	29,274,522	12,003,554
Cost of fuel, electricity and process supplies used.....			254,595
Total net value.....			11,747,959
IMPORTS—	Tons	\$	
Sand, silica, for glass and carborundum manufacture, etc.....	172,073	338,832	
Sand and gravel, n.o.p.....	86,692	62,485	
Silic or crystallized quartz, ground or unground.....	3,069	77,815	
Ganister.....	360	2,888	
Total.....		482,020	
EXPORTS—			
Sand and gravel.....	609,193	146,050	

(*) Does not include production of natural silica sand or of silica sand manufactured from quartz or silica rock; production of these are recorded under quartz in The Feldspar and Quartz Mining Industry, Chapter 8.

Table 374.—Production of Sand and Gravel in Canada, by Railway Operators, 1937 and 1938

Kind	1937		1938	
	Tons	Value	Tons	Value
		\$		\$
Sand—				
Moulding sand.....	90	135	81	135
Building sand and sand for concrete, roads, etc.....	22,891	3,681		
Other sand (including blast and engine sands).....	43,340	6,604	41,638	7,346
Sand and gravel—				
Sand and gravel for railway ballast.....	2,369,753	392,511	2,013,551	313,411
Sand and gravel for concrete, roads, etc.....	241,325	36,410	261,068	47,290
Crushed gravel.....				
Total.....	2,677,399	439,341	2,316,338	368,182

Table 375.—Production of Sand and Gravel in Canada, by Operators Other than Railways, 1937-1938

Kind	1937			1938		
	Washed or screened	Bank or pit-run	Value	Washed or screened	Bank or pit-run	Value
	Tons	Tons	\$	Tons	Tons	\$
Sand—						
Moulding sand.....	77,706	22,872	44,416	8,434	10,330	19,563
Building sand and sand for concrete, roads, etc.....	860,555	472,823	473,143	1,038,859	711,328	685,976
Core sand.....	855	267	1,520	4,528	128	5,612
Other sand (including blast, and engine sands).....	10,648	3,897	4,963	12,885	8,416	9,951
Sand and gravel—						
Sand and gravel for railway ballast.....	270,724	124,162	141,365	246,485	99,667	130,525
Sand and gravel for concrete, roads, etc.....	1,847,871	17,363,992	8,304,354	1,312,136	20,940,052	9,054,592
Mine filling.....	1,170,260	146,811			1,852,323	256,380
Crushed gravel.....	454,028	1,643,242	936,733	326,033	3,335,940	1,471,773
Total.....	3,522,387	20,801,515	10,053,355	2,949,360	26,958,184	11,634,372

Table 376.—Production of Sand for Building and Concrete, Roads, etc., and Sand and Gravel for Railway Ballast and for Concrete, Roads, etc., 1931-1938

Year	Sand		Sand and gravel			
	For building, concrete, roads, etc.		For railway ballast		For concrete, roads, etc.	
	Tons	\$	Tons	\$	Tons	\$
1931.....	3,189,428	1,069,210	3,593,451	459,531	14,352,283	4,784,298
1932.....	2,368,304	745,091	2,097,224	324,648	9,604,113	3,181,105
1933.....	775,412	218,559	561,538	110,449	9,957,832	3,907,911
1934.....	686,631	209,002	1,454,618	266,292	12,418,408	3,411,751
1935.....	787,412	264,435	2,267,195	415,092	17,531,047	5,357,331
1936.....	956,502	362,542	6,318,681	1,054,703	14,336,640	5,216,942
1937.....	1,356,269	476,824	2,764,639	533,876	19,453,188	8,340,764
1938.....						
Nova Scotia.....			74,520	11,876	2,002,828	1,001,315
New Brunswick.....	13,502	4,775	77,840	10,505	3,741,253	1,809,928
Quebec.....	893,506	288,713	948,772	156,928	7,461,283	1,865,060
Ontario.....	743,173	351,503	733,786	161,707	5,563,961	2,109,124
Manitoba.....	30,460	10,485	53,792	14,812	1,070,748	594,502
Saskatchewan.....	6,515	2,111	79,646	17,652	850,912	607,548
Alberta.....	9,111	8,785	260,157	37,331	496,030	474,451
British Columbia.....	53,920	19,604	131,190	33,125	1,326,241	639,954
Canada.....	1,750,187	685,976	2,359,703	443,936	22,513,256	9,101,882

Table 377.—Production of Sand and Gravel in Canada, by Provinces, 1938

Kind	Nova Scotia	New Brunswick	Quebec	Ontario	Manitoba	Saskatchewan	Alberta	British Columbia
Sand—								
Moulding sand.....tons	30			18,105	710			
\$	75			19,202	421			
Building sand and sand for concrete, roadwork, etc.....tons		13,502	893,506	743,173	30,460	6,515	9,111	53,920
\$		4,775	288,713	351,503	10,485	2,111	8,785	19,604
Core sand.....tons			2,000	2,528	128			
\$			1,800	3,698	114			
Other sand (including blast sand, engine sand, etc.).....tons		945	8,006	24,810			27,462	1,716
\$		175	1,944	10,348			4,608	222
Sand and gravel—								
Sand and gravel for railway ballast.....tons	74,520	77,840	948,772	733,786	53,792	79,646	260,157	131,190
\$	11,876	10,505	156,928	161,707	14,812	17,652	37,331	33,125
Sand and gravel for concrete, roads, etc.....tons	2,002,828	3,741,253	7,461,283	5,563,961	1,070,748	850,912	496,030	1,326,241
\$	1,001,315	1,809,928	1,865,060	2,109,124	594,502	607,548	474,451	639,954
Mine filling.....tons				1,087,951		90,960		673,412
\$				178,498		28,000		49,882
Crushed gravel.....tons			3,209,837	356,967	60,246	9,720		25,203
\$			1,218,428	211,963	25,478	7,200		8,704
Total.....tons	2,077,378	3,833,540	12,523,404	8,531,281	1,216,034	1,037,753	792,760	2,211,682
Gross value.....\$	1,013,266	1,825,383	3,532,873	3,046,043	645,812	662,511	525,175	751,491

Table 378.—Cost of Fuel, Electricity and Process Supplies and Net Value of Production, in 1938

Province	No. of operators	Cost of fuel and electricity used	Cost of process supplies used	Net value of production
	\$	\$	\$	\$
Nova Scotia.....	4			1,013,266
New Brunswick.....	6			1,825,383
Quebec.....	861	19,128	2,248	3,511,499
Ontario.....	410	137,621	28,137	2,880,285
Manitoba.....	14	9,143	15,786	620,883
Saskatchewan.....	16	1,360	11,326	649,825
Alberta.....	7	599	150	524,426
British Columbia.....	21	20,951	8,148	722,392

Table 379.—Capital Employed in the Sand and Gravel Industry in Canada, by Provinces, 1938

	Capital employed as represented by:					
	Present cash value of the land*	Present value of buildings, fixtures, machinery, tools and other equipment	Inventory value of materials on hand, stocks in process, fuel and miscellaneous supplies on hand	Inventory value of finished products on hand	Operating capital (cash, bills and accounts receivable, prepaid expenses, etc.)	Total
	\$	\$	\$	\$	\$	\$
Nova Scotia.....	(a)	(a)	(a)	(a)	(a)	(a)
New Brunswick.....	5,000	(a)	(a)	(a)	(a)	5,000
Quebec.....	78,000	204,137	16,250	2,834	87,047	388,268
Ontario.....	185,263	897,687	56,857	53,637	344,401	1,537,845
Manitoba.....	474,940	117,701	23,563	12,869	159,783	788,856
Saskatchewan.....	28,190	53,614		5,000	21,198	108,002
Alberta.....	1,000	11,532	2,000		11,500	26,032
British Columbia.....	127,370	268,381	548	8,443	27,595	432,337
Canada.....	899,763	1,553,652	99,218	82,783	651,524	3,286,340

* Excluding unmined materials.

(a) Not available.

† Includes value of dredges.

Table 380.—Employees, Salaries and Wages in the Sand and Gravel Industry, by Provinces, 1938

Province	Average number of employees			Salaries and wages		
	Salaried employees	Wage-earners	Total	Salaries	Wages	Total
				\$	\$	\$
Nova Scotia.....		242	242		181,450	181,450
New Brunswick.....		1,508	1,508		907,777	907,777
Quebec.....	24	3,446	3,470	25,889	2,118,813	2,144,702
Ontario.....	58	571	629	92,325	408,346	500,671
Manitoba.....	17	269	286	36,157	133,083	169,240
Saskatchewan.....	4	478	482	8,681	267,750	276,431
Alberta.....	3	229	232	13,100	177,032	190,132
British Columbia.....	16	94	110	29,487	83,026	112,513
Canada.....	122	6,837	6,959	205,639	4,277,277	4,482,916

Table 381.—Average Number of Wage-Earners, by Months, 1937 and 1938

Month	1937	1938
January.....	280	458
February.....	265	476
March.....	305	466
April.....	1,885	935
May.....	8,514	12,762
June.....	14,961	14,195
July.....	15,153	13,889
August.....	11,503	13,872
September.....	11,307	12,905
October.....	4,893	9,559
November.....	2,026	1,259
December.....	434	574

SAND-LIME BRICK INDUSTRY

Six factories in Canada manufactured sand-lime building brick during 1938. Four of these plants were located in Ontario, 1 in Quebec and 1 in Manitoba. The value of their products, including brick and building blocks, was \$153,763 compared with \$197,921 in 1937.

Output of sand-lime brick amounted to 8,774 M valued at \$99,573, a decrease in both quantity and value from the 11,363 M brick at \$125,880 in 1937. Production of sand-lime building blocks declined also to 373 M at \$37,660 from 851 M at \$67,091.

The number of workers employed in this industry during 1938 averaged 68 per month, including 14 on salaries and 54 on wages. The average number of wage-earners was 42 in January, dropped to 39 in February, then advanced to the high of 80 in July, after which it dropped to 42 in November and closed the year at 44 in December.

Table 382.—Products, 1937 and 1938

Products	1937		1938	
	Quantity	Selling value at works	Quantity	Selling value at works
		\$		\$
Sand-lime brick..... M	11,363	125,880	8,774	99,573
Sand-lime building blocks..... M	851	67,091	373	37,660
Other products (*).....		4,950		16,530
Total.....		197,921		153,763

(*) Includes some cinder blocks.

Table 383.—Materials Used in Manufacturing, 1937 and 1938

Materials	Unit of measure	1937		1938	
		Quantity	Cost at works	Quantity	Cost at works
			\$		\$
Quicklime.....	ton	4,812	34,161	3,956	28,954
Sand.....	cu. yd.	39,463	29,124	18,777	20,133
Other materials.....					3,789
Total.....	xxx		63,285		52,876

THE STONE INDUSTRY IN CANADA

The Stone Industry in Canada comprises two main divisions:—1. **The Stone Quarrying Industry**, including quarries and dressing works operated in conjunction with quarries, and 2. **The Monumental and Ornamental Stone Industry**, comprising the operations of firms having no quarries but who operate dressing works where stone for building and monumental purposes is cut, polished or otherwise finished. In the Census of Industry, statistics on the stone quarrying industry are included under mining, while statistics of the monumental and ornamental stone industry are included under manufactures. For convenience this report carries data for both of these industries.

These two major divisions, constituting the Canadian stone industry, represented a capital investment of \$16,359,288 in 1938. Production during the year totalled \$9,458,800 which figure includes the value of the quarry output and the value added by manufacturing in the secondary stone industry. Salaried employees and wage-earners employed in 1938 numbered 4,076 and their combined earnings amounted to \$3,859,085.

The two industries are treated separately in the following review.

1. PRIMARY PRODUCTION—THE STONE QUARRYING INDUSTRY

The kinds of stone quarried in Canada include granite (trap rock, syenite and other igneous rock), limestone, marble, sandstone, and slate. Stone of almost every known variety occurs in Canada; rocks of the igneous areas of British Columbia, Manitoba, Ontario, Quebec and the Maritime Provinces exhibit a wide range of physical characteristics, some varieties being especially noted for their richness of colour and beauty of crystallization. The sedimentary rocks, including limestones, sandstones and marbles are quarried at various points in Canada. The products from quarries operating in these different formations not only yield high class structural and decorative materials but provide the chemical and other allied industries with many of their increasing requirements.

The gross value of all varieties of stone produced in Canada during 1938 totalled \$5,556,026 compared with \$6,939,360 in 1937. Comprising the tonnage shipped in 1938 were 705,307 tons of granite valued at \$1,379,417; 4,288,507 tons of limestone at \$3,864,619; 19,375 tons marble at \$87,274; 101,854 tons sandstone at \$218,405 and 979 tons of slate worth \$6,311. Of the total value of stone sold in 1938 the value of Quebec shipments amounted to 45 per cent, Ontario 42 per cent and British Columbia 6 per cent.

Rough and dressed stone sold for building purposes in 1938 amounted to 49,666 tons valued at \$725,402 including 13,762 tons of granite, 30,647 tons of limestone, 239 tons of marble and 5,018 tons of sandstone. Shipments of stone for chemical purposes totalled 551,737 tons worth

\$468,000, comprising 551,501 tons of limestone and 236 tons of marble. Road construction during the year under review absorbed 2,721,922 tons of stone valued at \$2,347,010, concrete aggregate 981,739 tons at \$791,971 and railroad ballasting 86,019 tons worth \$58,816.

Imports of stone and various stone products during 1938 were appraised at \$768,412 compared with \$1,151,373 in 1937. Exports of stone from Canada in 1938 were valued at \$225,586 as against \$250,593 in the preceding year.

The number of firms in the stone quarrying industry reported as active in 1938 totalled 429; capital employed amounted to \$11,187,274; employees numbered 2,815; salaries and wages paid aggregated \$2,298,154 and the cost of fuel, electricity and process supplies used was reported at \$890,350.

Table 384.—Production (Sales) of Stone from Canadian Quarries, by Kinds and by Provinces, 1937 and 1938

Province	Granite (a)	Limestone (b)	Marble	Sandstone	Slate	Total
1937						
Nova Scotia.....	tons 16,430	24,398		137,893		178,721
	\$ 50,966	35,914		192,218		279,098
New Brunswick.....	tons 936	51,929		4,603		57,468
	\$ 74,961	55,600		8,480		139,041
Quebec.....	tons 218,743	1,653,556	14,957	70,726	414	1,958,396
	\$ 611,125	1,474,653	61,348	65,424	471	2,213,021
Ontario.....	tons 625,160	3,582,175	6,685	8,680	300	4,223,000
	\$ 769,860	2,841,469	27,247	22,984	2,258	3,663,768
Manitoba.....	tons 138	41,053				41,191
	\$ 1,796	63,432				65,228
Alberta.....	tons	13,182		43		13,225
	\$	24,935		2,254		27,189
British Columbia.....	tons 273,692	176,513		13,220	186	463,611
	\$ 318,725	177,939		52,561	2,790	552,015
Canada.....	tons 1,135,099	5,542,806	21,642	235,165	900	6,935,612
	\$ 1,827,433	4,673,942	88,595	343,871	5,519	6,939,360
1938						
Nova Scotia.....	tons 5,765	20,957		36,940		63,662
	\$ 31,768	34,696		80,480		146,944
New Brunswick.....	tons 954	7,985		4,340		13,279
	\$ 71,600	19,855		28,870		120,325
Quebec.....	tons 294,446	1,850,019	8,838	42,587	494	2,196,384
	\$ 757,531	1,672,260	46,580	51,010	547	2,527,928
Ontario.....	tons 254,917	2,242,964	10,537	4,662	211	2,513,291
	\$ 351,941	1,911,841	40,694	16,220	2,469	2,323,165
Manitoba.....	tons 329	39,049				39,378
	\$ 6,120	95,497				101,617
Alberta.....	tons	1,691				1,691
	\$	6,148				6,148
British Columbia.....	tons 148,896	125,842		13,325	274	288,337
	\$ 160,457	124,322		41,825	3,295	329,899
Canada.....	tons 705,307	4,288,507	19,375	101,854	979	5,116,022
	\$ 1,379,417	3,864,619	87,274	218,405	6,311	5,556,026

NOTE.—Not included in the above limestone statistics are 1,344,868 tons of limestone consumed in the cement industry in 1938 and 1,465,168 tons in 1937. Limestone used in the Canadian lime industry is also not included; it is estimated that approximately 900,000 tons of limestone were burned in the manufacture of lime in 1938 and about 980,000 tons in 1937.

(a) All igneous rocks included.

(b) Includes dolomite, also marl for agricultural purposes.

Table 385.—Production* of Stone in Canada, by Provinces, Showing Purposes for which Used, 1938 (a)

Item	Nova Scotia	New Brunswick	Quebec	Ontario	Manitoba	Alberta	British Columbia	Canada
Building—								
Rough.....tons	549	36	7,581	13,173	2,727		2,300	26,366
\$	6,500	461	36,133	85,057	25,624		14,670	168,445
Dressed.....tons	679	860	13,521	6,810	909		530	23,300
\$	25,000	25,600	372,314	72,448	31,500		30,095	556,957
Monumental and ornamental—								
Rough.....tons	107	450	4,362	451	132		9,700	15,202
\$	1,128	2,847	46,508	4,710	4,034		13,250	72,527
Dressed.....tons	470	458	5,842	3	197		210	7,180
\$	24,500	67,892	248,064	99	2,036		33,210	375,801
Flagstone.....tons		20	41	862				923
\$		200	41	2,818				3,059
Curbstone.....tons			5,969	150	200		6	6,325
\$			11,990	2,000	750		205	14,945
Paving blocks.....tons			960	20			1	981
\$			10,653	235			20	10,998
Lining open-hearth furnaces.....tons					634			634
\$					1,440			1,440
Chemical—								
Flux in iron and steel furnaces.....tons			3,712	184,493	2,161			190,366
\$			8,028	133,748	3,640			145,416
Flux in non-ferrous smelters.....tons				103,083			21,155	121,238
\$				72,699			15,556	88,255
Glass factories.....tons			236			308		544
\$			1,158			463		1,621
Pulp and paper mills.....tons	3,072	1,940	66,027	22,707	1,474		19,352	114,572
\$	7,454	3,295	67,729	19,798	1,803		26,901	126,980
Sugar refineries.....tons		90						90
\$		360						360
Other chemical uses.....tons				121,927				121,927
\$				105,368				105,368
Pulverized stone—								
Asphalt filler.....tons	284		6,529	2,818				9,631
\$	1,704		20,934	7,412				30,050
Dusting coal mines.....tons						761		761
\$						3,045		3,045
Agricultural purposes.....tons	12,601	5,955	93,296	17,449		269	119	129,689
\$	20,038	16,200	97,152	11,616		1,075	476	146,557
Other uses.....tons			9,723	16,885				26,608
\$			2,430	5,837				8,267
Crushed stone for artificial stone.....tons			1,840	727				2,567
\$			10,532	2,829				13,361
Roofing granules.....tons			13	8,954			274	9,241
\$			22	75,791			3,295	79,108
Poultry grit.....tons			542	883	420	353	40	2,238
\$			1,987	4,232	1,637	1,565	294	9,715
Stucco dash.....tons			1,259	1,194	66		92	2,611
\$			7,129	5,007	132		909	13,177
Terrazzo chips.....tons			373	4,260				4,633
\$			2,424	17,007				19,431
Rock wool.....tons				4,499				4,499
\$				4,204				4,204
Rubble and riprap.....tons	550	3,470	211,621	159,887	20,217		105,471	501,216
\$	600	3,470	157,338	105,084	17,838		74,902	359,232
Crushed stone—								
Concrete aggregate.....tons	950		730,656	249,832	301			981,739
\$	1,800		580,659	209,123	389			791,971
Road metal.....tons	44,400		1,011,373	1,536,959	8,928		120,262	2,721,922
\$	58,220		831,440	1,340,792	9,267		107,291	2,347,010
Railroad ballast.....tons			20,908	55,265	1,021		8,825	86,019
\$			13,263	35,251	1,477		8,825	58,816
.....tons	63,662	13,279	2,196,384	2,513,291	39,378	1,691	288,337	5,116,022
\$	146,944	120,325	2,527,928	2,323,165	101,617	6,148	329,899	5,556,026
Per cent of total.....Quantity	1.24	0.26	42.93	49.13	0.77	0.03	5.64	100.00
Value	2.64	2.16	45.53	41.81	1.82	0.11	5.93	100.00

NOTE.—See footnote to table 000.

* Sales or shipments from quarries.

(a) Includes the production of slate.

Table 386.—Production (Sales) of Stone from Canadian Quarries by Kinds Showing Purposes for which Used, 1938

For use as follows:	Granite (a)	Limestone (b)	Marble	Sandstone	Slate	Total
1938						
Building stone—Rough..... tons	6,468	17,094	59	2,745		26,366
..... \$	36,819	115,891	1,446	14,289		168,445
Dressed..... tons	7,294	13,553	180	2,273		23,300
..... \$	244,501	227,324	1,440	83,692		556,957
Monumental and ornamental stone—						
Rough..... tons	14,506	331	353	12		15,202
..... \$	53,059	1,776	17,592	100		72,527
Dressed..... tons	3,704	3,454	22			7,180
..... \$	294,001	79,156	2,644			375,801
Flagstone..... tons	80	363		463	17	923
..... \$	28	365		2,555	111	3,059
Curbstone..... tons	5,975	200		150		6,325
..... \$	12,195	750		2,000		14,945
Paving blocks..... tons	961			20		981
..... \$	10,673			235		10,908
Lining open-hearth furnaces..... tons		634				634
..... \$		1,440				1,440
Chemical—						
Flux in iron and steel furnaces..... tons		190,366				190,366
..... \$		145,416				145,416
Flux in non-ferrous smelters..... tons		124,238				124,238
..... \$		88,255				88,255
Glass factories..... tons		308	236			544
..... \$		463	1,158			1,621
Pulp and paper mills..... tons		114,572				114,572
..... \$		126,980				126,980
Sugar refineries..... tons		90				90
..... \$		360				360
Other chemical uses..... tons		121,927				121,927
..... \$		105,368				105,368
Pulverized stone—						
Whiting (substitute)..... tons						
Asphalt filler..... tons		9,631				9,631
..... \$		30,050				30,050
Dusting coal mines..... tons		761				761
..... \$		3,045				3,045
Agricultural purposes and fertilizer plants..... tons		128,289	1,400			129,689
..... \$		142,707	3,850			146,557
Other uses..... tons		26,589			19	26,608
..... \$		8,162			105	8,267
Crushed stone for manufacture of artificial stone..... tons		10	2,557			2,567
..... \$		10	13,351			13,361
Roofing granules..... tons	8,889	8			344	9,241
..... \$	75,468	8			3,632	79,108
Poultry grit..... tons	6	1,222	1,010			2,238
..... \$	90	4,568	5,057			9,715
Stucco dash..... tons	21	137	2,453			2,611
..... \$	210	831	12,136			13,177
Terrazzo chips..... tons	15		4,618			4,633
..... \$	22		19,409			19,431
Rock wool..... tons		4,499				4,499
..... \$		4,204				4,204
Rubble and riprap..... tons	240,151	240,361	3,381	16,829	494	501,216
..... \$	156,607	183,725	3,447	14,906	547	359,232
Crushed stone—						
Concrete aggregate..... tons	88,111	885,643		7,985		981,739
..... \$	75,230	706,350		10,391		791,971
Road metal..... tons	329,126	2,327,033	3,106	62,552	105	2,721,922
..... \$	420,514	1,837,424	5,744	81,412	1,916	2,347,010
Railroad ballast..... tons		77,194		8,825		86,019
..... \$		49,991		8,825		58,816
Total Canada (b)..... tons	705,807	4,288,507	19,375	101,854	979	5,116,022
..... \$	1,379,417	3,864,619	87,274	218,405	6,311	5,556,026

(a) Includes all igneous rock.

(b) Does not include limestone used in Canadian lime and cement industries, but includes marl used for agricultural purposes.

GRANITE

Large areas in Canada are underlain by granite, much of which is suitable for all the purposes for which the stone is used. The stone quarried consists of granite and related crystalline igneous rocks which are used for building, decorative, ornamental, or construction purposes, and is obtained from properties in Nova Scotia, New Brunswick, Quebec, Ontario, Manitoba and British Columbia. Granite is employed for building purposes mainly in the larger buildings such as public and semi-public structures and institutions. In the building trade coloured granites are being used to an increasing extent in the form of thin polished slabs for trim for buildings where contrast is called for in the main colour scheme. At present, the so-called "black granite" and the "grey" seem to be in most demand for monuments. Stone used in the National Memorial at Ottawa was quarried during 1938 from Rivière-à-Pierre district Northeast of Three Rivers, Quebec; more than 800 tons of dressed granite were used in the erection of the memorial, and it was necessary to quarry about 7,000 tons to obtain sufficient material free from blemishes, and of proper sizes. The largest block used weighed over 40 tons dressed. (Bureau of Mines—Ottawa.).

LIMESTONE

"Limestone in blocks of large dimensions for building is quarried in the provinces of Quebec, Ontario, and Manitoba. In Quebec there are three quarries at St. Marc des Carrieres, Portneuf county, producing grey limestone, and several in and near Montreal producing limestone of similar colour. In Ontario a large quarry near Queenston in the Niagara peninsula yields silver-grey limestone as well as small quantities of buff and of variegated buff and grey; and at Longford Mills, near Orillia, buff, silver-grey, and brown limestone for use both as marble and building stone is quarried. The Manitoba quarries, three in number, are near Tyndall and yield mottled grey, mottled buff, and mottled variegated limestone. Besides these large quarries, the products of which have a wide shipping range, small quarries producing building stone for local use are worked near Quebec City, Montreal, and Hull, in the province of Quebec; and at Ottawa, Kingston, Erin, and Wiarton in Ontario. Rubble is their chief product.

"For domestic use limestone is marketed in a variety of forms ranging from huge squared blocks of dimension stone used in construction, to extremely fine dust used chiefly as a mineral filler. Some few of the products are processed but little if at all from the condition in which they are obtained after blasting, as for example limestone used in the wood pulp industry, but the bulk of the output is crushed and screened for use as road metal, concrete aggregate, railroad ballast, and as flux in metallurgical plants. Large quantities are used in the manufacture of Portland cement, lime, rock wool and various chemical products. It is of interest to note that in 1938 Canadian rock wool made from argillaceous dolomite was exported to England, Switzerland, Sweden, Holland and the Argentine.

"Of significance in connection with future production of pure limestone is the progress being made in beneficiation whereby siliceous material is in part removed from limestone by flotation. This method of purifying limestone is now in use at several Portland cement plants in various parts of the world.

"New uses for limestone are continually being developed. The dolomitic variety when crushed or when calcined has long been used as a refractory material for fettling the bottoms of basic open-hearth furnaces, but its applications as a refractory have been limited because of the readiness with which it air-slakes and also because of its chemical activity. Recently, however, a method has been found of combining dolomite (and also calcium limestone) with silica in the presence of a stabilizing agent to give a refractory product that contains no active lime or silica, does not disintegrate, and is comparable in refractoriness with materials that are several times as expensive. Dolomite is assuming a position of importance in Europe as a raw material for making metallic magnesium. Canada possesses ample deposits of high-grade dolomite and developments are being watched with interest in this country. A present use for limestone, capable of enormous development is in agriculture. Though the necessity of applying limestone or lime to agricultural land in order to maintain or increase soil fertility has been emphasized for years by authorities on agriculture, the quantity so used in Canada is still very small, whereas if the proper quantity were applied it would constitute one of the principal outlets for limestone." (Bureau of Mines—Ottawa.).

SANDSTONE

Canadian sandstone has been utilized extensively in the construction of many important public buildings in Canada and is finding increasing favour as a material in the construction of the better type home. The rock occurs in Canada in a variety of colours including white, reddish brown, purple (bands), yellow and grey. Shipments of sandstone were made in 1938 from quarries located in all of the provinces with the exception of Prince Edward Island, Manitoba and Saskatchewan. Of the total output in 1938, quarries in Nova Scotia contributed 36,940 tons, valued at \$80,480, Quebec 42,587 tons at \$51,010 and British Columbia 13,325 tons worth \$41,825. In 1938 the market for sandstone in Canada included railroad ballast, highway metal, rubble and riprap, building stone, flagstone and concrete aggregate.

MARBLE

"Marble quarries are operated in the provinces of Quebec, Ontario, Manitoba and British Columbia for the production of squared blocks for sawing into slabs and for making monuments, and also for the production of broken marble for making terrazzo, stucco dash, whiting substitute, marble flour, artificial stone, and building rubble. A part of the production of some quarries is also marketed for chemical use. . . . Progress is being made in finding new ways of utilizing marble. Thin slabs of semi-translucent, light coloured marble have been used in large windows of buildings and white marble sand is being produced for use in white cement. Many deposits of beautifully coloured marbles, particularly in Ontario, Quebec and British Columbia, have never been fully investigated, the chief reason being that the present demand in Canada for marble of any one colour, other than for a staple variety, such as white, is comparatively small. In Quebec, four varieties of clouded grey marble, some of which are tinted and lined with green, and also black marble, are quarried at Phillipsburg. A small quantity of dry red marble is quarried, chiefly for use as tombstones, at Cap St. Martin near Montreal.

"In Ontario black marble is quarried at St. Albert, near Ottawa; buff and silver grey marbles are produced at Longford, near Orillia; and at Bancroft, Hastings County, a number of handsomely coloured marbles are available, the most striking of which, known as Bancroft Laurentian, is a clouded-grey breccia with a rich chocolate-coloured bond; white marble is quarried at Mar-mora and Haliburton, and buff, red, white, green and black marbles near Eldorado.

"In Manitoba, a number of highly coloured marbles are available and near Calgary in Alberta deposits of calcareous tufa are quarried for terrazzo chips. In British Columbia a bluish grey marble for making monuments is obtained at La Blanche station on the Lardeau branch of the Canadian Pacific Railway, while small quantities of white marble are quarried near Victoria and on Texada Island for the production of terrazzo, poultry grit, whiting substitute and marble sand.

"The Canadian Market calls for interior decorative marble almost entirely, as very little marble is used for the exteriors of buildings. A considerable quantity is used, however, for tombstones. There has been an increasing demand in recent years for marble in the form of terrazzo for flooring, instead of slabs or tiles. Prices of marble depend upon the quality and rareness of colouring, but they are governed largely by the prices of foreign marbles." (Bureau of Mines—Ottawa.).

SLATE

In 1938 slate was produced only in Quebec, Ontario and British Columbia; the output totalled 979 short tons valued at \$6,311 and was sold chiefly as roofing granules, and rubble and riprap. Imports of slate into Canada in 1938 comprised roofing slate, 1,174 squares valued at \$10,651 (all from United States); slate pencils and writing slates, \$5,244; other slate manufactures, \$19,935. The Nova Scotia Department of Mines reported that no work was performed during 1938 on the large deposits of excellent building slate located in that province.

"Mineral Trade Notes" United States Department of the Interior reported that there had been a wider use in the United Kingdom recently of slate for such purposes as billiard-table beds, monuments, brewing tanks, aquariums, electric switchboards and honing stones. Three years ago, after long research, a colouring process was discovered and patented by which a wide range of pastel shades, hitherto unobtainable in any roofing material, can be produced in slate. The colours are claimed to be absolutely permanent and the cost of the process is about one shilling per square yard.

Table 387.—Production of Stone for Building Purposes, Chemical Use, Cement Manufacture, Concrete Aggregate, Road Metal and Railroad Ballast, 1930-1938

		Building stone (a)	For chemical purposes (b)	For concrete aggregate	For road metal	For railroad ballast	For cement manufacture
1930.....	tons	173,204	586,456	2,115,104	3,910,245	2,036,981	2,925,399
	\$	4,184,778	540,534	1,623,904	3,434,935	1,674,298	.....
1931.....	tons	129,345	333,699	3,275,276	3,122,633	652,352	2,489,147
	\$	3,717,993	314,088	2,565,204	2,557,515	485,447	.....
1932.....	tons	62,951	226,966	1,929,756	1,847,371	89,835	1,141,376
	\$	1,035,571	188,820	1,320,088	1,474,870	84,930	.....
1933.....	tons	40,299	315,287	981,460	1,212,981	93,624	616,364
	\$	340,852	297,652	682,213	969,504	52,359	.....
1934.....	tons	52,665	489,580	821,099	2,062,487	345,802	806,546
	\$	490,095	447,429	608,240	1,668,927	209,296	.....
1935.....	tons	200,899	537,799	804,719	1,976,363	351,302	818,443
	\$	1,258,741	483,709	423,847	1,987,351	211,993	.....
1936.....	tons	42,335	615,207	1,014,145	1,903,927	784,081	1,180,358
	\$	714,616	553,597	730,617	1,653,134	659,656	.....
1937.....	tons	49,098	693,947	1,497,655	3,169,136	642,248	(c) 1,465,168
	\$	746,370	626,297	1,214,181	2,522,080	570,606	.....
1938.....	tons	49,666	551,737	981,739	2,721,922	86,019	(d) 1,358,689
	\$	725,402	468,000	791,971	2,347,010	58,816	.....

(a) Does not include monumental or ornamental stone.

(b) Does not include limestone used in Canadian lime industry.

(c) Includes shale.

(d) Includes 13,821 tons shale.

Table 388.—Consumption of Whiting, and Chalk, by Uses, as Reported to the Annual Census of Industry, 1937 and 1938

Industry	1937		1938	
	Tons	Cost at works	Tons	Cost at works
		\$		\$
Paints and pigments.....	6,183	108,290	6,304	113,206
Rubber.....	7,299	107,781	6,177	88,683
Miscellaneous textiles*	.....	13,088	.....	16,482
Explosives (a).....	211	1,454	243	1,671
Toilet preparations (a).....	†110	8,489	61	5,812

* Includes oilcloth and linoleum.

(a) Chalk. † Ground and precipitated.

Table 389.—Employees, Salaries and Wages, Specified Costs and Net Values, in the Stone Industry in Canada, by Provinces, 1938

Province	Firms	Average number of employees		Salaries and wages		Cost of fuel, electricity and process supplies used	Net value of production
		Salaried employees	Wage- earners	Salaries	Wages		
	No.	M.	F.	\$	\$	\$	\$
Nova Scotia.....	20	.....	.....	61	51,176	11,573	135,371
New Brunswick.....	6	8	.....	67	9,420	48,721	116,641
Quebec.....	189	128	10	1,606	134,700	1,104,382	2,119,729
Ontario.....	181	70	16	681	143,794	597,457	1,893,963
Manitoba.....	6	9	1	33	26,223	30,208	88,136
Alberta.....	2	.....	.....	.....	.....	.....	6,148
British Columbia.....	25	24	.....	101	33,822	118,251	305,688
Canada.....	429	239	27	2,549	347,959	1,950,195	4,665,676

Table 390.—Capital Employed in the Stone Quarrying Industry of Canada, by Provinces, 1938

—	Plants	Capital employed as represented by:					
		Present cash value of the land*	Present value of buildings, fixtures, machinery, tools and other equipment	Inventory value of materials on hand, stocks in process, fuel and miscellaneous supplies on hand	Inventory value of finished products on hand	Operating capital (cash, bills and accounts receivable, prepaid expenses, etc.)	Total
	No.	\$	\$	\$	\$	\$	\$
Nova Scotia.....	28	17,591	8,000	525	525	5,250	31,891
New Brunswick....	6	29,738	43,417	12,113	10,065	58,925	154,258
Quebec.....	204	1,354,468	2,530,455	297,310	375,609	661,678	5,219,529
Ontario.....	186	597,979	3,519,384	82,453	188,010	494,734	4,882,560
Manitoba.....	8	220,230	89,129	17,051	10,000	56,738	393,148
Alberta.....	2	(a)	(a)	(a)	(a)	(a)	(a)
British Columbia..	116	10,450	419,383	19,476	17,588	39,000	505,897
Canada.....	550	2,230,456	6,609,768	428,928	601,797	1,316,325	11,187,271

* Excluding unmined materials.

(a) Not available.

Table 391.—Average Number of Wage-Earners, by Months, 1937 and 1938

Month	1937	1938		Month	1937	1938	
		Quarry	Dressing Works			Quarry	Dressing Works
January.....	1,698	1,003	212	July.....	3,785	3,175	515
February.....	1,091	974	249	August.....	3,804	2,953	446
March.....	1,441	1,028	262	September.....	3,782	2,880	466
April.....	2,089	1,650	342	October.....	3,413	2,809	506
May.....	2,922	2,444	422	November.....	2,637	2,435	466
June.....	3,284	2,703	443	December.....	1,875	1,621	429

Table 392.—Imports into Canada and Exports of Stone, by Kinds, 1937 and 1938

—	1937		1938	
	Quantity	Value	Quantity	Value
		\$		\$
IMPORTS—				
Curling stone and handles.....pair	669	14,710	746	16,385
Building stone, other than marble or granite, planed, turned, cut or further manufactured than sawn on four sides.....ton	8	314	0-1	10
Flagstone, sandstone, and all building stone, not hammered, sawn or chiselled.....ton	5,818	34,479	3,604	20,757
Flagstone and building stone, other than marble or granite, sawn on not more than two sides.....ton	1,202	8,479	1,849	13,997
Granite, rough, not hammered or chiselled.....		80,273		62,735
Granite, sawn only.....		11,022		10,429
Granite, monuments.....		16,732		16,949
Granite, manufactures of, n.o.p.....		6,908		8,990
Marble, rough, not hammered or chiselled.....		16,729		23,102
Marble, sawn or sand rubbed, not polished.....		31,991		28,051
Marble, not further manufactured than sawn for tombstones..		12,655		11,886
Marble, manufactures of, n.o.p.....		18,327		8,634
Ornamental or decorative marble (not chips), unicolour or variegated, of colours or texture not produced in Canada; rough or dressed, etc., for church interiors(*).....		12,561		9,743
Paving blocks of stone.....		22		
Refuse stone, not sawn, hammered or chiselled.....ton	592,593	348,319	303,103	160,618
Slate roofing.....square	2,162	18,711	1,174	10,651
Slate pencils and school writing slates.....		5,790		5,244
Slate mantels and manufactures of slate, n.o.p.....		30,270		19,935
Chalk, china, Cornwall or cliff stone and mica schist.....		55,558		22,572
Mineral wool.....ton	1,015	81,050	669	45,109
Whiting, gilders' whiting and Paris white.....ton	11,992	126,015	10,701	116,923
Manufactures of stone, n.o.p.....		25,170		30,518
Lithographic stones not engraved.....		266		449
Chalk prepared.....		6,873		5,731
Pumice and pumice stone, lava and calcareous tufa, not further manufactured than ground.....		26,238		24,688
Grindstones, not mounted, and not less than 36 inches in diameter.....No.	1,587	157,699	840	91,205

Table 392.—Imports into Canada and Exports of Stone, by Kinds, 1937 and 1938—Conc.

	1937		1938	
	Quantity	Value	Quantity	Value
		\$		\$
IMPORTS—Concluded				
Burrstones, rough in blocks.....	No.	174	22	213
Ganister.....	ton	2,405	360	2,888
Total.....		1,151,373		768,412
EXPORTS—				
Crushed stone.....	ton	132,006	112,537	198,720
Granite and marble, unwrought.....	ton	1,234	657	5,042
Freestone, limestone, and other building stone, unwrought.....	ton	659	42	227
Dressed stone of all kinds.....		3,846		16,156
Grindstones, manufactured.....		135		5,441
Total.....		250,593		225,586

2. Secondary Production—The Monumental and Ornamental Stone Industry

In 1938 there were 234 stone dressing works whose operations were reported separately from the quarries. These works were engaged chiefly in cutting and polishing Canadian or imported stone to produce finished monuments or dressed stone for construction purposes. Output from these establishments was valued at \$3,902,774 in 1938, a gain of 15.7 per cent over the \$3,371,242 in 1937. Ontario plants, numbering 125, accounted for 57 per cent of the total production and the 48 works in Quebec made 22 per cent.

The average number of employees in this industry in 1938 was 1,261 compared with 1,159 in the previous year; payments in salaries and wages increased to \$1,560,931 from \$1,352,566.

Purchased materials, excluding fuel and power, used in manufacturing cost \$1,271,650 in 1938 as against \$1,142,885 in 1937.

Output value of dressed monumental and ornamental stone decreased 0.6 per cent during 1938 to \$1,751,839 from \$1,762,400, and the value of dressed building stone advanced 46.9 per cent to \$1,418,306 from \$965,412 in 1937.

Table 393.—Production from the Monumental and Ornamental Stone Industry, by Provinces, 1937 and 1938

	Granite		Marble		Marble chips and dust	Limestone		Finished monuments, lettered only	Other products	Total
	Monu-ments	For building pur-poses	Monu-ments	For building pur-poses		Monu-ments and bases	For building pur-poses			
	\$	\$	\$	\$	\$	\$	\$	\$	\$	\$
Prince Edward Island										
1937.....	9,000	67	17,400					8,568		35,035
1938.....	14,610	108		13,250				6,175		34,143
Nova Scotia—										
1937.....	59,888	89	14,046	737		2,954	31,669		2,198	111,581
1938.....	71,476	100	11,179			2,591		24,650	3,762	113,758
New Brunswick—										
1937.....	70,367	1,000	1,340			1,430		1,030	250	75,417
1938.....	50,789	1,290	700	1,520				1,100	300	55,699
Quebec—										
1937.....	316,326	53,507	29,598	161,979	2,800	3,745	119,457	23,277	40,731	691,420
1938.....	323,656	40,004	28,068	203,539	67,923	13,993	140,783	22,822	17,026	857,814
Ontario—										
1937.....	800,638	25,913	65,075	187,649		100,577	266,483	264,542	213,483	1,924,360
1938.....	819,917	15,123	40,121	142,964	75	63,431	669,865	264,559	231,959	2,248,014
Manitoba—										
1937.....	48,563	1,554	6,674	19,200	350	1,150	3,711	31,217	3,155	115,574
1938.....	69,190	670	7,457	8,250	325	11,785		34,990	4,659	137,326
Saskatchewan—										
1937.....	41,773	1,933	23,883	958	229	4,850	5,430	14,113	7,469	100,638
1938.....	31,266	670	21,718	175	2,980	4,918	3,475	13,933	4,710	83,845
Alberta—										
1937.....	48,103	6,000	15,389	5,000	7,040	2,498	10,500	12,212	3,198	109,940
1938.....	61,131	8,000	16,316		10,009	3,628	18,000	13,480	1,202	131,766
British Columbia—										
1937.....	74,237	89,494	2,696	31,882		200	1,200	1,670	5,898	207,277
1938.....	72,965	150,520	2,244			8,690		3,960	2,030	240,409
Canada—										
1937.....	1,468,895	179,557	176,101	347,405	10,419	117,404	438,450	356,629	276,382	3,371,242
1938.....	1,515,000	216,485	127,803	369,698	81,312	109,036	832,123	385,669	265,648	3,902,774

DIAMOND DRILLING INDUSTRY, 1939

There were 35 firms engaged in contract diamond drilling of Canadian mineral deposits during 1939 compared with 43 in 1938. The income received by this industry from drilling operations conducted during the year under review totalled \$3,013,249 as against \$3,956,564 in the preceding year. The number of employees in 1939 was reported at 2,920, and the amount of salaries and wages distributed totalled \$1,615,615. The footage drilled during 1939 in the entire Dominion aggregated 2,063,292 feet, of which 59 per cent was completed in Ontario, 29 per cent in Quebec, and 8 per cent in British Columbia. Contract diamond drilling was also conducted in Nova Scotia, New Brunswick, Manitoba, Saskatchewan and the Northwest Territories.

The industry as a whole purchased, in 1939, borts, ballas, carbons, readysset bits, etc., amounting in value to \$607,806.

Imports into Canada during 1939 of diamond dust or bort and black diamonds for borers were valued at \$4,129,532 compared with \$3,950,698 in 1938. Imports of diamond drills and core drills, not including motive power, and electrically operated rotary coal drills, and coal cutting machines, n.o.p., and integral parts of the foregoing, for use exclusively in mining operations, were appraised at \$104,203 in 1939 as against \$151,519 in 1938. Imports of unset diamonds into Canada in 1939 were valued at \$1,405,792 compared with \$983,112 in 1938.

Not included in this survey are data relating to the drilling of gas and oil wells and diamond drilling conducted by Canadian mining companies with their own personnel and equipment. Statistics relating to these latter operations are combined with those pertaining to the Canadian mining industry proper.

Diamond Drilling Operations in Canada, 1939 and 1938

Province	Footage drilled	Income from drilling	Number of employees	Total salaries and wages paid
1939		\$		\$
Nova Scotia.....	9,298	18,441	20	12,914
New Brunswick.....	190	351	5	223
Quebec.....	599,121	900,559	793	423,538
Ontario.....	1,212,174	1,747,290	1,858	929,886
Manitoba.....	30,761	52,565	41	16,219
Saskatchewan.....	15,078	15,535	6	5,615
Alberta.....				
British Columbia.....	173,887	246,845	177	210,493
Yukon.....				
Northwest Territories.....	22,783	31,663	20	16,727
Canada.....	2,063,292	3,013,249	(a) 2,920	1,615,615

Value of stones and ready set bits purchased, 1939..... \$607,806

1938				
Nova Scotia.....	5,598	4,000	15	8,794
New Brunswick.....	6,091	11,530	6	4,660
Quebec.....	717,162	1,328,908	465	571,697
Ontario.....	1,315,621	2,146,904	910	1,026,178
Manitoba.....	42,700	70,924	29	19,864
Saskatchewan.....	32,905	56,171	54	20,843
Alberta.....				
British Columbia.....	116,789	200,125	105	102,360
Yukon.....				
Northwest Territories.....	59,907	138,002	43	47,592
Canada.....	2,296,773	3,956,564	1,627	1,801,988

Value of stones and ready set bits purchased, 1938..... \$649,374

(a) Includes part-time employees.

EXPLANATORY NOTES

Method of Computing Quantities and Values of the Mineral Production of Canada in 1938.

Arsenic.—White arsenic (As_2O_3) shipped from Canadian smelters at its sales value.

Bismuth.—(a) Recoverable metal in silver-lead-bismuth bullion shipped to foreign smelters for refining at an arbitrary price; (b) Bismuth metal produced at Canadian smelters valued at the average New York price for the year.

Cadmium.—Smelter production valued at the average London price for the year.

Cobalt.—Cobalt content of the various cobalt products sold by the Ontario smelter producing these products added to the cobalt content of ores and residues exported for treatment in foreign smelters; the value given is the net amount received by the shippers.

Copper.—(a) Recoverable copper in ores and concentrates exported valued at the average London price for the year, in Canadian funds; (b) Copper in blister copper made at Manitoba, Ontario and Quebec smelters valued at the average London price for the year in Canadian funds; (c) Copper in copper-nickel matte exported from Canadian smelters valued at an arbitrary price agreed upon between the Dominion Bureau of Statistics and the Ontario Department of Mines.

Gold.—Gold in bullion produced and the recoverable gold in all other Canadian mine products is valued at the standard rate of \$20.671834 per fine ounce until the end of 1930. For succeeding years, unless otherwise specified, gold is valued at the average price on world markets transposed to Canadian funds.

Lead.—Recoverable lead in ores exported from Canada added to lead contained in base bullion made at Trail, B.C., valued at the average London quotations for the year in Canadian funds.

Nickel.—(a) Refined and electrolytic nickel produced at Canadian refineries valued in Canadian funds at the average price obtained for such products sold during the year; (b) Nickel in oxides and salts sold from Canadian smelters and refineries at its total selling value in Canadian funds in the form in which it was sold; (c) Nickel in matte exported from Canada valued at an arbitrary figure agreed upon by the Ontario Department of Mines and the Dominion Bureau of Statistics (representative of the value of the nickel in matte form).

Platinum Group Metals.—Recoverable metals in smelter products and placer platinum at the average London price and transposed to Canadian funds.

Silver.—Silver bullion produced and the recoverable silver in other smelter products, and the recoverable silver in Canadian ores exported, at the average New York price in Canadian funds for the refined metal.

Tellurium and Selenium.—Smelter production valued at the average London price for the year.

Zinc.—Refined zinc produced by the Consolidated Mining and Smelting Co., Ltd., at Trail, B.C., and by the Hudson Bay Mining and Smelting Co., Ltd., Flin Flon, Manitoba, and the recoverable zinc in concentrates exported, valued at the average monthly price quoted in London, in Canadian funds.

Coal.—Output tonnage evaluated prorata according to income from sales.

Other Non-Metallic Minerals, Clay Products and Structural Materials.—Shipments during the year at their respective sales values.

Imports.—Statements and quantities and values are based on the declarations of importers, as subsequently checked by government officials.

The value of imported merchandise is the fair market value or the price thereof when sold for home consumption in the principal markets of the country whence and at the time when the same were exported directly to Canada. The price and value of the goods in every case are stated as in condition packed ready for shipment, the fair value being shown in the currency of the country of export, and the selling price to the purchaser in Canada shown in the actual currency in which the goods were purchased. In the case of goods that are the manufacture or produce of a foreign country, the currency of which is substantially depreciated, the value stated is the value that would be placed on similar goods manufactured or purchased in the United Kingdom and imported from that country, if such similar goods are made or produced there. If similar goods are not made or produced in the United Kingdom, the value stated is the value of similar goods made or produced in any European country, the currency of which is not substantially depreciated.

Exports.—Statements of quantities and values are based on the declaration of exporters as subsequently checked by government officials.

The value of exports of Canadian merchandise is the actual cost or the value at the time of exportation at the points in Canada whence originally shipped.

Weight.—Weight, where shown in imports and exports is the net weight of the goods, excluding the weight of the covers or receptacles, except in the cases of certain goods, as provided in the tariff.

The expression "ton" means 2,000 pounds, and cwt. 100 pounds, avoirdupois. Where other units of quantity are used, imperial standards apply.

Unless otherwise arranged, the data relating to the operations of less than three firms producing the same commodity or mineral are not published separately.

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